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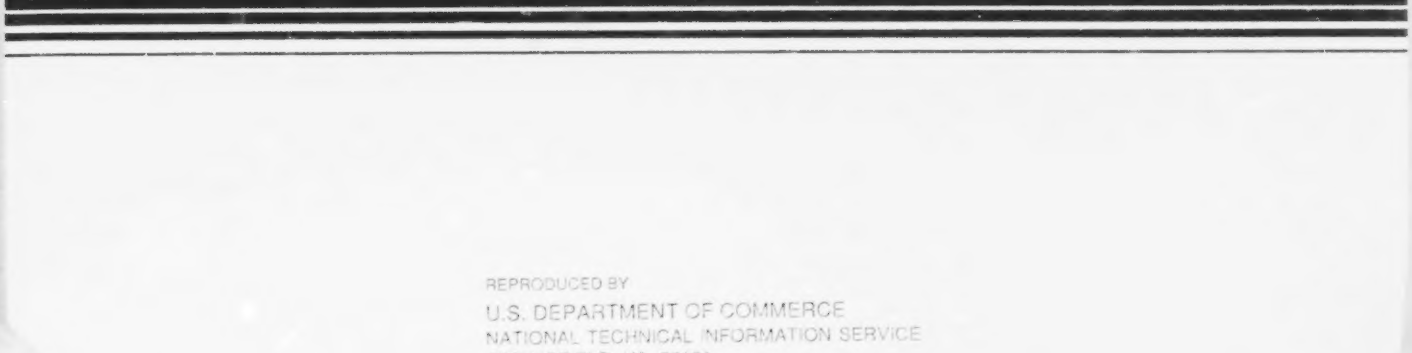

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PROGRESS TOWARD IMPLEMENTING SUPERFUND FISCAL YEAR 1987

REPORT TO CONGRESS

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COMPREHENSIVE ENVIRONMENTAL
RESPONSE, COMPENSATION, AND
LIABILITY ACT (CERCLA) OF 1980,
AS AMENDED BY THE
SUPERFUND AMENDMENTS AND
REAUTHORIZATION ACT (SARA) OF 1986

OFFICE OF EMERGENCY AND REMEDIAL RESPONSE
U.S. ENVIRONMENTAL PROTECTION AGENCY

APRIL 1989

NOTICE

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For further information about this Report, contact the Policy and Analysis Staff in the Office of Program Management, Office of Emergency and Remedial Response 202/382-2182. Individual copies of the Report can be obtained from the Public Information Center (PIC) by calling 202/475-7751 or the Superfund Docket and Information Center (SDIC), Room M2427, 202/382-3046, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460.

Progress Toward Implementing Superfund: Fiscal Year 1987

FOREWORD

We are pleased to submit the Environmental Protection Agency's first Annual Report on the progress made by the Agency during fiscal year 1987 in implementing the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986. This Report, and the information it contains, is required by CERCLA section 301(h). The Report includes a description of minority firm participation in Superfund contracts, and of our efforts to encourage their participation, as required by section 105(f). The Report meets the requirement of section 301(h)(1)(E) for an annual update on progress being made on sites subject to review under section 121(c). In addition to satisfying the section 301(h)(1)(E) requirement, this Report satisfies the reporting requirements of section 121(c). The report of the EPA Inspector General on his findings concerning the reasonableness and accuracy of the information in this Report related to EPA's activities, as required by section 301(h)(2), is included as Appendix F.

EPA made significant progress and accomplished much during fiscal year 1987 in implementing CERCLA as amended. This progress occurred despite adverse circumstances, including a hiatus in Superfund's funding preceding reauthorization. The year's accomplishments, in the removal program particularly, and in the remedial program in most cases, met or exceeded our targets for 1987. Much of this progress was characterized by efforts to implement many new provisions. In particular, provisions specific to the long-term remedial program that are changing the nature of EPA's responsibility, and, consequently, our relationship with the public, State and local governments, potentially responsible parties, and other Federal departments and agencies.

In addition to providing an overall perspective on progress in the past fiscal year, the Report also contains information that Congress specifically requested in section 301(h)(1), including a detailed description of each of 70 feasibility studies that were completed in fiscal year 1987; a report on the status of remedial actions, including enforcement activity, in progress at the end of the fiscal year; and an evaluation of newly developed feasible and achievable permanent treatment technologies.

This first Annual Report to Congress on Superfund implementation progress will serve as the foundation for subsequent Reports. We welcome your ideas and suggestions on how we might improve the Report for future years.

William K. Reilly

William K. Reilly
Administrator

Jonathan Z. Cannon
Acting Assistant Administrator for
Solid Waste and Emergency Response

Progress Toward Implementing Superfund: Fiscal Year 1987

CONTENTS

Page

FOREWORD: William K. Reilly and Jonathan Z. Cannon iii

CONTENTS v

ACKNOWLEDGMENTS xviii

1.0 EXECUTIVE SUMMARY 1

Fiscal 1987 Accomplishments 2

Exhibit 1.0-1 Summary of Fiscal 1987 Superfund Program Activities 3 3

Exhibit 1.0-2 Summary of Program Activity by Fiscal Year 4 4

Removal Program Activities 7

Pre-Remedial Program Activities 8

Remedial Program Activities 8

Program Management Initiatives 10

Other Implementation Activities 12

Statutory Deadlines and Report Requirements 13

2.0 RESPONDING TO RELEASES OF HAZARDOUS SUBSTANCES 15

2.1 Notification and Reporting of Hazardous Substances 15

2.1.1 Overview 15

2.1.2 Past and Ongoing Activities 15

2.1.3 Progress in Fiscal Year 1987 16

2.2 The Removal Program 16

2.2.1 Overview 16

2.2.2 Progress in Fiscal Year 1987 17

2.2.2.1 Polychlorinated Biphenyl (PCB) Removals 17

2.2.2.2 The 1000th Removal--Moreland Site 17

Exhibit 2.2-1 Fiscal 1987 Removals by State 18

Preceding page blank

CONTENTS
(continued)

Page

2.2.2.3 The Environmental Response Team 20

2.2.2.4 Monitoring of Removal Activities 20

2.2.2.5 Policy and Guidance 20

2.2.3 Status of Removal Activities in Fiscal Year 1987 Compared with 1981-86 21

Exhibit 2.2-2 Removal Actions by Fiscal Year 22

Exhibit 2.2-3 Completed Removals by Incident Category 23

2.3 The Remedial Program 24

2.3.1 Overview 24

2.3.2 Inventory of Hazardous Substance Releases 24

Progress in Fiscal Year 1987 24

2.3.3 Preliminary Assessments 24

Exhibit 2.3-1 Historical Superfund Pre-Remedial Program Accomplishments 25

Progress in Fiscal Year 1987 26

2.3.4 Site Inspections 26

Progress in Fiscal Year 1987 26

2.3.5 Hazard Ranking System 27

Progress in Fiscal Year 1987 27

2.3.6 Listing on the National Priorities List 28

Progress in Fiscal Year 1987 28

2.3.7 Remedial Investigation and Feasibility Study 28

Exhibit 2.3-2 Map of National Priorities List Sites 29

Exhibit 2.3-3 National Priorities List Sites Per State/Territory July 1987 . . . 30

Exhibit 2.3-4 Historical National Priorities List Sites 32

Progress in Fiscal Year 1987 33

CONTENTS
(continued)

Page

Exhibit 2.3-5 Fiscal 1987 Accomplishments for Remedial Investigation/ Feasibility Study Starts and Records of Decision 35

Exhibit 2.3-6 Historical Superfund Remedial Investigation/Feasibility Study Starts and Records of Decision 36

2.3.8 Record of Decision/Selection of Remedy 37

Progress in Fiscal Year 1987 37

Summary of Fiscal Year 1987 Selected Remedies 38

Exhibit 2.3-7 Summary of Remedy Selection in Records of Decision Signed During Fiscal 1987 39

2.3.9 Remedial Design/Remedial Action 40

Progress in Fiscal Year 1987 40

Exhibit 2.3-8 Historical Data on Remedies Selected in Records of Decision 41

2.3.10 Operation and Maintenance 41

2.3.11 Deletion of Facilities 41

Exhibit 2.3-9 Fiscal 1987 Accomplishments for Remedial Design and Remedial Action Starts 42

Exhibit 2.3-10 Historical Superfund Program Remedial Design and Remedial Action Starts 43

2.3.12 State Assurance of Capacity 44

2.3.13 Additional Enforcement Activities 44

2.3.13.1 Negotiated Settlements 44

Progress in Fiscal Year 1987 44

Notice Procedures 45

Nonbinding Allocations of Responsibility 46

Mixed Funding 46

De Minimis Settlements 46

Covenants Not To Sue 47

CONTENTS
(continued)

Page

Arbitration 47

2.3.13.2 Civil and Criminal Litigation 47

Past and Ongoing Criminal Enforcement Activities 48

Progress in Fiscal Year 1987 48

2.3.13.3 Enforcement Regulations, Policies, and Guidances 48

Administrative Record 49

Indemnification of Response Action Contractors 49

Supplementary Enforcement Directives 50

2.4 **Status of Active Remedial Investigations/Feasibility Studies and Remedial Actions** 50

Operable Units 50

2.4.1 **Status of Remedial Investigations and Feasibility Studies** 51

Exhibit 2.4-1 Status of Remedial Investigation/Feasibility Study and Remedial Action Projects at the End of Fiscal 1987 52

Exhibit 2.4-2 Remedial Investigation/Feasibility Study and Remedial Action Projects in Progress at the End of Fiscal 1987 by Region/State . . . 53

RI/FS Initiatives 55

2.4.2 **Status of Remedial Actions** 55

RA Initiatives 55

2.4.3 **Initiatives to Meet Schedules** 56

Enforcement Initiatives 56

Regional Initiatives 56

2.5 **Status of Facility Reviews Under CERCLA Section 121(c)** 56

2.5.1 **Facilities Subject to Review** 57

Exhibit 2.5-1 Facilities Subject to CERCLA Section 121(c) 58

2.5.2 **List of Facilities Subject to Review** 59

CONTENTS
(continued)

Page

2.6 The Cost Recovery Program Under CERCLA Section 107 59

Exhibit 2.6-1 Cost Recovery Activities 60

Exhibit 2.6-2 Value of Cost Recovery Settlements by Fiscal Year 61

3.0 THE FEDERAL-STATE PARTNERSHIP IN IMPLEMENTING CERCLA 62

3.1 Overview 62

3.2 Progress in Fiscal Year 1987 63

3.2.1 Oversight Policy 63

3.2.2 Superfund Memorandum of Agreement 63

3.2.3 State Involvement Regulations 63

3.2.4 Training 65

3.2.5 Notice of Limitations on the Payment of Response Claims 65

3.2.6 Other Initiatives 66

4.0 PUBLIC INFORMATION AND COMMUNITY RELATIONS 67

4.1 Public Information 67

4.1.1 Superfund Hotline 67

4.1.2 Superfund Docket and Information Center 67

4.1.3 Public Information Center 68

4.1.4 Hazardous Waste Ombudsman 68

4.2 Community Relations 68

4.2.1 Public Participation Under CERCLA Section 117 69

4.2.2 Technical Assistance Grants Under CERCLA Section 117(e) 70

4.2.3 Public Participation in Development of Administrative Records Under CERCLA Section 113(k) 70

CONTENTS
(continued)

Page

5.0 PROGRAM AND IMPLEMENTATION SUPPORT 71
  5.1 Administrative System Support 71
    5.1.1 Modification of CERCLIS 71
    5.1.2 Superfund Comprehensive Accomplishments Plan 72
    5.1.3 Strategic Planning and Management System/Action Tracking System 72
    5.1.4 Superfund Enforcement Tracking System 73
    5.1.5 Case Budget System 73
    5.1.6 Cost Documentation Monitoring System 73
    5.1.7 OSWER Directives System 73
  5.2 Training Programs 74
    5.2.1 Training Programs in Fiscal Year 1987 74
    5.2.2 Meeting Critical OSWER Training Needs 74
    5.2.3 OSWER Training Documents 75
    5.2.4 Organizational Improvements 76
      Superfund Work Force Planning Project 76
      Technology Transfer 76
      National Response Team Training Committee 77
      Training for Other Federal Agencies 77
    5.2.5 Future of Training Programs 77
  5.3 Contracting Support and Programs 78
    5.3.1 Overview 78
      Exhibit 5.3-1 Fiscal 1987 Contract Awards 79
    5.3.2 Response Support Contracts 79
      Laboratory Support Contracts 79

CONTENTS
(continued)

Page

Exhibit 5.3-2 Site Samples Analyzed for Remedial Investigations/ Feasibility Studies by Fiscal Year 80

Removal Support Contracts 80

Remedial Support Contracts 81

Enforcement Support Contracts 82

5.4 **Superfund Resource Utilization** 82

Exhibit 5.4-1 Fiscal 1987 Superfund Program Resources to Regional Offices 83

Exhibit 5.4-2 Historical Superfund Program Resources to Regional Offices 84

5.4.1 **EPA Superfund Program Activities** 85

Hazardous Substance Response 85

Enforcement 85

Exhibit 5.4-3 Fiscal 1987 Superfund Resources by Program Function 86

Exhibit 5.4-4 Fiscal 1987 Superfund Resources by EPA Office and Function 87

Exhibit 5.4-5 Historical Superfund Program Resource Distribution 88

Management and Support 89

Research and Development 89

5.4.2 **Other Executive Branch Department and Agency Superfund Activities** 89

Department of the Interior 90

Department of Transportation 90

Exhibit 5.4-6 Fiscal 1987 Superfund Interagency Support Resources 91

Department of Health and Human Services 91

Department of Commerce 92

Department of Justice 92

Department of Labor 92

Federal Emergency Management Agency 92

CONTENTS
(continued)

Page

6.0 EPA RULEMAKING ACTIONS TO IMPLEMENT CERCLA 93

6.1 Designation of Hazardous Substances Under CERCLA Section 102(a) 93

Past and Ongoing Activities 93

6.2 Payment of Research Costs Under CERCLA Section 104(i)(5)(D) 93

6.3 National Contingency Plan Under CERCLA Section 105 94

6.4 Financial Responsibility Under CERCLA Section 108 95

6.5 Awards Regulations Under CERCLA Section 109(d) 95

6.6 Review of Denied Claims Under CERCLA Section 112(b)(2) 95

6.7 Indemnification of Response Action Contractors Under CERCLA Section 119(c) 95

6.8 Reimbursement to Local Governments Under CERCLA Section 123(d) 96

6.9 Natural Resource Damage Assessment Reimbursement Under CERCLA Section 301(c)(1) 96

6.10 Health and Safety/Worker Protection Standards Under SARA Section 126(a), (e), and (f) 96

7.0 DEVELOPMENT AND EVALUATION OF PERMANENT TREATMENT TECHNOLOGIES 97

7.1 Overview 97

7.2 Superfund Innovative Technology Evaluation Program Design 97

7.2.1 Superfund Innovative Technology Evaluation Demonstration Program 98

Demonstration Program Reports 99

The Fiscal 1987 Demonstration Program 99

Completed Demonstrations 99

Demonstrations Underway 100

Technologies Selected from First Proposal Solicitation But Not Yet Underway .. 101

Plans for Fiscal 1988 102

CONTENTS
(continued)

Page

7.2.2 Measurement and Monitoring Techniques Development Program and Technology Transfer Program 102

7.2.3 Technology Transfer/Clearinghouse Program 103

7.3 Treatability Studies 104

Special Treatability Studies 104

7.4 Superfund Technology Support Project 105

7.5 International Survey 105

8.0 TECHNOLOGICAL AND HEALTH-RELATED RESEARCH AND DEVELOPMENT AND TECHNICAL ASSISTANCE 106

8.1 CERCLA Authority Related to Research and Development As Amended by SARA . . 106

8.2 Technology Research, Development, and Demonstration 107

8.2.1 Treatment Technology Evaluation 107

Site-Surface Treatment 107

Ground-water Restoration 107

8.2.2 Personnel Protection 108

8.2.3 Superfund Research Grants 108

8.3 Health-Related Research and Development 108

8.3.1 EPA Health Effects, Risk Assessment, and Detection Research 108

Toxicity Assessment 109

Exposure Assessment 109

Risk Characterization 109

Internal Dosimetry 109

Chemical Mixtures 109

Noncancer Health Effects 110

CONTENTS
(continued)

Page

8.3.2 Agency for Toxic Substances and Disease Registry Research and Development Program 110

Epidemiologic and Pilot Studies 110

Health Surveillance Systems 110

Toxicological Profiles and Testing Needs 111

Human Exposure Assessment 111

Information Dissemination Research 111

Clinical Toxicology 111

Health Education Research 111

8.4 Technical Assistance Provided in Fiscal Year 1987 112

8.4.1 Chemical Fate, Transport, and Ecological Effects 112

8.4.2 Site Risk Assessments 112

8.4.3 Chemical Assessments 112

8.4.4 Engineering Reviews and Assistance 112

8.4.5 Monitoring Support 112

9.0 EPA AND AGENGY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY HEALTH-RELATED ACTIVITIES 114

9.1 Overview of the Health Assessment Program 114

9.2 Progress in Fiscal Year 1987 114

Health Assessments 115

Health Consultations 115

10.0 IMPLEMENTATION OF THE FEDERAL FACILITIES REQUIREMENTS 116

10.1 Overview of the Federal Facilities Program 116

10.2 Federal Facilities Hazardous Waste Compliance Docket 116

Exhibit 10.2-1 Federal Facilities Listed on the Initial Hazardous Waste Compliance Docket 117

CONTENTS
(continued)

Page

Exhibit 10.2-2 Distribution by Region of Federal Facilities on the Hazardous Waste Compliance Docket 118

10.3 Federal Facility Preliminary Assessments/Site Investigations 118

10.4 Federal Facilities Proposed for and Listed on the National Priorities List 119

10.5 Federal Real Property Transfer Regulations Under CERCLA Section 120(h)(1) 119

10.6 Interagency Agreements Under CERCLA Section 120(e)(2) 119

10.7 Report to Congress on EPA Responsibilities Under CERCLA Section 120(e)(5) 120

Exhibit 10.7-1 EPA Facilities on the Hazardous Waste Compliance Docket 121

11.0 MINORITY FIRM PARTICIPATION IN SUPERFUND CONTRACTING 122

11.1 EPA Procedures to Identify Qualified Minority Firms 122

Memorandum of Understanding with the Minority Business Development Agency 122

MBE Coordinators in EPA Regional Offices 122

Survey of State and Local Governments 122

Small Business Administration Section 8(a) Program 123

EPA Procurement History Files 123

The MBDA PROFILE System 123

11.2 EPA Efforts to Encourage Participation 123

Minority Procurement Conferences 123

MBE/WBE Information Seminars 123

OSDBU MBE/WBE Training Workshops 124

Minority Business Training 124

MBDA National and Regional Conferences 124

Letters to Other Federal Agencies Participating in the Superfund Program 124

Publications on Superfund Participation 124

CONTENTS
(continued)

Page

11.3 Participation by Minority Firms in Superfund Contracting 124

Exhibit 11.3-1 Minority Firm Share of Superfund Contracting by Type, Fiscal Year 1987 126

12.0 THE NATIONAL RESPONSE TEAM AND REGIONAL RESPONSE TEAMS 128

NRT and RRT Accomplishments in Fiscal Year 1987 128

RRTs 128

13.0 EXECUTIVE BRANCH ESTIMATE OF RESOURCES NEEDED TO COMPLETE SUPERFUND IMPLEMENTATION 129

13.1 Introduction 129

An RI/FS Cost Study 130

An Analysis of Superfund's Unfunded Liability 130

13.2 EPA Estimate of Resources Necessary to Complete Superfund Implementation 130

Program Support 131

Site-Related Work 132

Direct Site Support 132

13.2.1 Remedial Program Costs 133

Exhibit 13.2-1 EPA Superfund Staffing Requirements by Fiscal Year 133

Exhibit 13.2-2 EPA Superfund Funding Requirements by Fiscal Year 134

Exhibit 13.2-3 Summary of EPA Superfund Workload by Fiscal Year 135

Exhibit 13.2-4 EPA Superfund Interagency Funding by Fiscal Year 136

13.2.2 Cost Recovery Revenues 137

13.3 Other Executive Branch Department and Agency Estimates of Resources Necessary to Complete Superfund Implementation 137

Department of Defense 138

Department of the Interior 138

Exhibit 13.3-1 Annual Superfund Resource Needs of Other Federal Departments and Agencies 139

CONTENTS
(continued)

Page

Exhibit 13.3-2 Federal Superfund Implementation Funding Requirements by Fiscal Year 140

Exhibit 13.3-3 Federal Superfund Implementation Staffing Requirements by Fiscal Year 141

Department of Transportation 141

General Services Administration 142

Department of Commerce 142

Department of Justice 142

Department of Labor 142

Federal Emergency Management Agency 142

14.0 OTHER EPA ACTIONS TO IMPLEMENT CERCLA **143**

14.1 Implementation of CERCLA on Indian Lands **143**

Study of Hazardous Waste Sites on Indian Lands 143

14.2 Love Canal: Habitability and Land Use Study **144**

APPENDICES

A. Statutory Language for this Report and EPA and Executive Branch Implementation of CERCLA as Amended by SARA **147**

B. Fiscal 1987 Removal Actions **150**

C. Detailed ROD Descriptions **161**

D. Status of Active Remedial Investigations/Feasibility Studies and Remedial Actions in Progress on September 30, 1987 . . . . **354**

E. EPA *Federal Register* Superfund Documents in Fiscal 1987 . . . . **386**

F. EPA Inspector General Report Under Section 301(h)(2) **390**

G. List of Exhibits **410**

H. List of Abbreviations **413**

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* * *

Progress Toward Implementing Superfund: Fiscal Year 1987

1.0 EXECUTIVE SUMMARY

This Annual Report to Congress is required by section 301(h) of CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986. The Report provides an overview of progress made by the Environmental Protection Agency (EPA) in implementing a wide range of Superfund program activities during fiscal year 1987. Particularly noteworthy are the field accomplishments including the number of removal actions, pre-remedial activity completions, and remedial project starts. The Agency also made progress in improving management systems, increasing State and local government and public involvement, developing implementation guidance, and carrying out rulemaking activities.

The Report documents progress made in the removal, pre-remedial, and remedial programs, including enforcement activities, and also contains specific information required by section 301(h)(1), such as the status of remedial projects, the development of new technologies, and estimates of resources required to complete the Superfund program. The Report also describes the participation of minority firms in Superfund contracting, as required by section 105(f).

The fiscal year began with the enactment of SARA, which ended an extended period of steadily declining activity in the Superfund program. This drop in the level of activity was caused by the near depletion of the Hazardous Substance Trust Fund (or Superfund) due to the absence of reauthorization legislation. As a consequence of SARA's passage in October 1986, the Agency's principal objectives for 1987 were to:

- Accelerate the program after a one-year slowdown;
- Implement CERCLA, as amended by SARA; and
- Undertake improvements to management systems.

This Report describes how EPA achieved these objectives in the various program areas.

Although this Report is primarily directed to the members of Congress, EPA anticipates that the public, industry representatives, and persons interested in the Superfund program will find the Report useful as a basic reference document.

The report required by section 301(h)(2), on the results of the EPA Inspector General's review of this Report for reasonableness and accuracy, is included in Appendix F. The final paragraph of this Executive Summary provides the location in the Report of all information specifically required by statute.

Numbers associated with outputs and resources in this Report may differ slightly from previously published numbers due to accounting differences by various EPA offices and corrections and adjustments made following the close of the fiscal year.

Fiscal 1987 Accomplishments

Overall, EPA's accomplishments in the removal and remedial programs equalled or exceeded those in any previous year. EPA met or exceeded targets set for 23 of 27 Superfund progress measurements used by EPA senior managers. Although EPA missed targets set for several remedial program measures, the Agency averaged a 78 percent completion rate.

The Agency initiated a record number of removal action starts (254), signed a significant number of remedy selection decision documents (records of decision or RODs) (75), started a record number of remedial designs for construction of selected remedies (94), and began 54 new remedial action construction projects. The term "start" as used in the Report does not necessarily mean the beginning of field work. The Agency uses the term "start" to indicate that funds have been obligated through the contracting process so that field work may begin. Figures used for accomplishments in the Report, for the most part, are based on national data. Figures for some activities are shown in more detail, e.g., removal actions by EPA Region.

On September 30, 1987, the end of the fiscal year, remedial activities were underway at 533 Superfund sites. There were 642 ongoing remedial projects: 548 remedial investigation/feasibility studies (RI/FSs), 15 FSs, and 79 remedial actions (RAs). The status of these projects was as follows:

- Of the 563 RI/FS and FS projects, 48 (8.5 percent) were ahead of schedule; 148 (26.3 percent) were on schedule; 323 (57.4 percent) were behind schedule; and there was no available completion estimate for 44 (7.8 percent).

- Of the 79 RA projects, 13 (16.5 percent) were ahead of schedule; 24 (30.4 percent) were on schedule; 31 (39.2 percent) were behind schedule; and there was no available completion estimate for 11 (13.9 percent).

Project delays can be attributed to many factors, including the hiatus in program funding during the FY85-86 period, the need to complete contracting arrangements before projects can begin, and EPA employee turnover. The Agency's goal is to complete RI/FS projects in 18 to 21 months. Historically, however, they have taken 24 to 35 months to complete.

The Agency developed numerous management initiatives that are expected to expedite implementation of Superfund program activities in the future. Some of the most important include streamlining the RI/FS process, diversifying the remedial and removal contracts and delegating control of those contracts to the Regions, and developing a second generation management information tool, the CERCLA Information System (CERCLIS). Other efforts now underway entail improving EPA's working relationship with States and the other Federal departments and agencies, developing and applying a variety of new technologies, and encouraging the public to participate more actively in the Superfund program.

Exhibit 1.0-1

Summary of Fiscal 1987 Superfund Program Activities

Removal

Starts	304
Fund-lead	*254*
PRP-lead	*50*
Completions	226
Fund-financed	*195*
PRP-financed	*31*

Pre-Remedial

CERCLIS Inventory	27,571
PA - Preliminary Assessments	4,001
SI - Site Inspections	1,343
NPL - National Priorities List	951
Sites added	*99*
Proposed sites	*64*

Remedial

Sites with remedial activities in progress on September 30, 1987	533
RI/FS - Remedial Investigation/ Feasibility Study Starts	183
Fund-financed	*127*
PRP-financed	*56*
RI/FSs in progress on September 30,1987	563
ROD - Records of Decision Signed	75
Fund-financed	*44*
PRP-financed	*31*
RD - Remedial Design Starts	94
Fund-financed	*70*
PRP-financed	*24*
RA - Remedial Action Starts	54
Fund-financed	*35*
PRP-financed	*19*
RAs in progress on September 30, 1987	79

Post-Remedial

O&M - Sites that entered the Operation and Maintenance phase	5

Exhibit 1.0-2
Summary of Program Activity by Fiscal Year*

Activity	1980	1981	1982	1983	1984	1985	1986	1987
Removal Completions	--	18	67	108	229	208	176	226
CERCLIS Site Inventory	8,000	10,500	13,386	16,309	18,884	22,621	25,194	27,571
PA Completions	2,204	1,072	1,209	1,809	4,447	5,181	4,262	4,001
SI Completions	613	428	566	642	1,308	1,618	1,267	1,343
NPL Sites Added	--	--	--	406	132	3	170	99
RI/FS Starts	--	21	35	123	155	188	83	183
RODs Signed	--	--	4	13	38	68	84	75
RD Starts	--	5	4	12	21	29	45	94
RA Starts	--	--	9	11	25	15	21	54
NPL Deletions	--	--	5	--	--	--	8	--

*All data illustrated in this exhibit are explained in the body of the Report.

Even before the enactment of SARA, EPA began planning for its implementation. Several workgroups were formed late in fiscal year 1986 to begin the analysis required to implement the anticipated major amendments to CERCLA. The most significant efforts focused on the required revisions to the National Contingency Plan (NCP) and the Hazard Ranking System (HRS) methodology, and on the development of regulations to implement the Technical Assistance Grant (TAG) provision. The TAG interim final regulation was published on March 23, 1988.

On October 24, 1986, one week after SARA was passed, EPA issued a "date of enactment" memorandum that provided guidance on how to make the transition from operating procedures under the old law to procedures that would address the priorities and achieve the objectives under CERCLA, as amended. The highest priority was initiating construction projects at sites already in the remedial pipeline. On December 24, 1986, the Assistant Administrator for Solid Waste and Emergency Response (OSWER) issued important interim guidance on criteria to be used in selecting Superfund remedies.

Another early initiative involved EPA's participation in drafting the Executive Order that transferred the authority and responsibility for implementing CERCLA from the President to EPA and other Executive Branch organizations. The President signed Executive Order 12580 on January 23, 1987, following months of work by staff at EPA, the Office of Management and Budget (OMB), the National Response Team, and other agencies. After receiving its responsibilities from the President, EPA developed internal policy documents that redelegated the Administrator's responsibilities to Regional Administrators (RAs) and Assistant Administrators (AAs).

On February 26, 1987, the Administrator, Lee M. Thomas, signed EPA's interim delegations of authority, which made implementation of new Superfund provisions possible, pending final resolution of how authority and responsibility would be allocated within the Agency. On September 13 and 21, 1987, the Administrator signed the last two of a series of decision memoranda, completing most of the internal delegations assigning EPA's CERCLA responsibilities.

As a result of early efforts, EPA met CERCLA's deadlines for revising the reportable quantity (RQ) regulations and initiated several other RQ rulemakings. EPA prepared a Report to Congress required by SARA on the transportation of hazardous materials, and published an important interim final rule on Reimbursement to Local Governments on October 21, 1987.

Implementing the CERCLA-mandated revisions to the NCP has been a major effort for the past year, involving a broad and comprehensive rulemaking process to revise as well as restructure the document. All existing subparts of the NCP will be revised, (some will be consolidated), and several new subparts will be added. The principal revisions apply to the removal program and the selection of remedy process. In addition, other regulations that are major in their own right are part of the NCP revisions now underway, including State involvement and Administrative Record regulations. The revised NCP was proposed in December 1988 (53 *FR* 51394).

Another key initiative was to issue interim guidance for implementing those Superfund provisions that became effective with the passage of SARA and were not dependent upon promulgation of regulations. During the year, EPA issued 10 such interim guidance documents. As part of the CERCLA enforcement program, several policy and guidance documents were developed, some in response to CERCLA provisions, to further the program's goals. Those that have been finalized include Streamlining the Settlement Process (February 12, 1987) and Nonbinding Allocations of Responsibility (NBARs) (May 28, 1987); interim guidance on *de minimis* settlements was issued on June 19, 1987.

On March 5, 1987, EPA held a national teleconference designed to communicate CERCLA's provisions to a broad range of EPA Regional and State program staff. After the teleconference, six 2-day conferences were held to describe and discuss the implementation issues and policies with EPA staff from the 10 Regional offices and with State program staff. Also, throughout the year, EPA conducted a variety of outreach and training activities designed to assist EPA Regional and State staff. Headquarters' program staff and Regional staff coordinated visits to all EPA Regions to provide hands-on assistance in developing RODs and incorporating CERCLA requirements into projects in progress.

With support from EPA, the Agency for Toxic Substances and Disease Registry (ATSDR) conducted 106 health assessments, published procedures for requesting health assessments, and issued a manual on conducting health assessments. Of the 106 health assessments conducted, 60 were at National Priorities List (NPL) sites in 28 States, and 45 were at non-NPL sites in 21 States. One health assessment was conducted in response to a public petition. In addition, ATSDR also completed 1,467 health consultations in 50 States, the District of Columbia, and several territories and foreign countries and awarded 11 cooperative agreements to States, enabling them to develop the capability to perform their own health assessments. ATSDR did not issue any health advisories in FY87.

Existing technical support programs were continued and several new research programs were begun to satisfy the need to better assess the health risks posed by hazardous substances and to develop treatment technologies that provide permanent protection of human health and the environment. In response to the mandate for technology development, EPA carried out research in several areas in addition to the Superfund Innovative Technology Evaluation (SITE) program. This research included: treatment technology evaluation, which addressed four major treatment processes and continued research on ground-water cleanup alternatives; personnel protection research directed toward safety concerns, such as safety procedures and protective clothing and equipment; and a university research grant program to conduct applied research on measurement and monitoring methods and on *in situ* treatment of hazardous waste.

In response to CERCLA-authorized health-related research, EPA, ATSDR, and the National Institute for Environmental Health Sciences (NIEHS) agreed on an integrated research effort in which each agency will focus on specific research areas. EPA will concentrate on risk assessment techniques, toxicological test methods, and exposure assessment methodology. ATSDR's research will be related to CERCLA-mandated health assessments, and NIEHS will support multidisciplinary biomedical research through university grants.

The EPA Office of Research and Development (ORD) also provided a range of technical assistance during the year. Endangerment assessments of 20 sites were conducted and a risk assessment review group was established. Chemical toxicity profiles were prepared for 74 chemicals; RQ documentation was prepared for 50 suspected carcinogens, along with draft documentation for 191 others; and 12 rapid response assessments of specific chemicals were made. ORD also provided engineering assistance to Regional offices for 35 sites and monitoring support to Regional offices and the National Enforcement Investigations Center (NEIC) for 400 sites.

Because of the potential for adverse ambient air impacts from Superfund site emissions, the Office of Air Quality Planning and Standards (OAQPS) and the Regional Air Program Offices were given increased responsibility and resources to provide technical assistance to the Superfund program in evaluating air impacts and to advise the Superfund Regional offices on appropriate removal and remedial actions for Superfund sites where air issues are of concern. An Air/Superfund Coordinator has been designated at Headquarters and in each Regional Air Office to facilitate coordination between the Air and Superfund programs.

The cost recovery program focused on projecting cost recovery revenue for the next 5 years and on prioritizing sites for cost recovery based on statutes of limitations and availability of potentially responsible parties (PRPs). EPA Regional offices referred 37 sites with a combined dollar value of approximately $30,500,000 to Headquarters for cost recovery action. The Agency completed 62 cost recovery settlements, including settlements that did not require litigation, with a total reimbursement to the Trust Fund of $18,866,000.

Removal Program Activities

Removal actions are relatively short-term actions designed to protect public health, welfare, or the environment. Removal actions may be undertaken in response to an emergency, such as a fire, chemical leak, or explosion. Removal actions can be quite extensive, involving significant engineering and requiring several million dollars to complete.

In a program with a high level of success since it began in fiscal year 1981, by far the largest number of removals was conducted this year. Using Fund resources, 254 removal actions were begun during the year and 195 were completed. Responsible parties contributed an additional 50 removal action starts and 31 removal completions. Also, the program reached a major milestone this year by beginning action on its 1,000th removal, ending the year with a 7-year program total of 1,057 Fund-financed removal action starts. The Agency also oversaw the removal activities of responsible parties, States, and local governments at 422 sites.

The removal program reissued four Regional Emergency Response Cleanup Services (ERCS) zone contracts, and awarded the following additional contracts: two Technical Assistance Team (TAT) contracts; four dioxin contracts; one cleanup standards 8(a) (minority) contract; two Regional ERCs, both of which are 8(a) (minority) contracts; one site-specific cleanup contract; and two environmental emergency response unit (EERU) contracts. These contracts in combination provide the technical assistance and cleanup service that EPA needs to implement an effective removal program.

In addition, EPA began working to implement the recommendations of the On-Scene Coordinator (OSC) Management Support Task Force. The recommended changes are intended to assist the OSCs in meeting current administrative requirements for financial management, contract management, and documentation for cost recovery. Five Regions established Administrative Support Units to implement the recommendations, and the remaining Regions will establish similar units in FY88.

Pre-Remedial Program Activities

Pre-remedial activities are investigative and analytical activities undertaken to evaluate the threat, or potential threat, to human health or the environment posed by conditions at a site, and to determine the need for further action and set priorities for that action. The Agency made substantial progress toward meeting the statutory goal of completing preliminary assessments (PAs) by January 1988 on all sites in CERCLIS at the time CERCLA was amended. PAs were completed on more than 4,000 sites, and site inspections (SIs) on more than 1,340 sites. Ninety-nine sites (including 32 Federal facilities) were listed as NPL sites, and 64 sites (including one Federal facility) were proposed for listing. In addition, the pre-remedial program substantially completed development of Update 7 to the NPL in FY87, and, on June 24, 1988, (53 *FR* 23988) proposed 229 new sites.

The pre-remedial program also increased the level of effort for conducting a PA so that lead agencies can more effectively identify sites that require SIs. Guidance is also being developed to direct more resources to SI activity at sites most likely to be proposed for the NPL.

As required by section 105 of CERCLA, a major effort to revise the HRS was undertaken during the year that would ensure, "to the maximum extent feasible," that the HRS accurately assesses the relative risk to human health and the environment posed by potential NPL sites. Accordingly, a number of new evaluation factors are being added to the HRS, including the threat that the contamination poses to the human food chain and ambient air quality, and the effect of contamination of surface water used for human consumption and for recreational purposes. Although the rule will not become effective in time to meet the statutory deadline established by section 105(c)(1) (October 1988), revision to the HRS is on an accelerated schedule, and the final rule is expected in the second half of fiscal 1989.

Remedial Program Activities

Remedial actions are generally undertaken at complex sites and usually take longer than removal actions. Considerable study is required to select the most effective cleanup action, which may cost millions of dollars to implement. Project accomplishments for the remedial program were significant: 183 RI/FS starts (123 "first start" RI/FSs and 60 subsequent RI/FSs); 75 RODs (58 initial

RODs and 17 subsequent RODs) were signed; 94 remedial design (RD) starts; 54 RA starts; 8 RA completions; and 5 sites entered the operation and maintenance phase.

A significant number of remedial actions were initiated or completed by PRPs. Of the 123 first-start RI/FSs, 47 are being conducted by PRPs. Twenty-four of the 94 remedial design starts were begun in accordance with consent decrees. At the end of the year, several additional consent decrees were in the final stages of preparation.

To implement the remedy selection provisions of CERCLA, the Agency issued three interim guidance documents: Interim Guidance on Superfund Selection of Remedy (December 24, 1986); Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements (July 9, 1987); and Additional Interim Guidance for FY87 Records of Decision (July 24, 1987).

In addition, throughout FY87 EPA continued to draft guidance for conducting remedial investigations and feasibility studies under CERCLA and for preparing RODs and proposed plans. Interim ROD guidance is scheduled for release in FY88; a final guidance document, however, will not be issued until the revisions to the NCP are completed.

The decisionmaking process underlying the selection of a remedy for a given site is a multi-step process. Remedial alternatives analyzed in the feasibility study are developed by screening the universe of potentially applicable technologies and process options. By using information on contaminant types and concentrations and onsite characteristics from the remedial investigation site characterization, technologies and process options that clearly are not appropriate are screened out. Each remaining alternative is evaluated with respect to nine criteria developed to address the statutory requirements of CERCLA section 121. The criteria include such factors as overall protection of human health and the environment, long-term effectiveness and permanence, and reduction of toxicity, mobility, or volume of contaminants. Based on the results of the evaluation, the Regional Administrator or Assistant Administrator, in consultation with appropriate State personnel, selects the remedy for a site. When the remedy has been selected, the ROD is prepared.

There were 75 RODs signed in FY87, involving a total of 119 remedial components. Thirty-two of these components will employ at least one type of treatment that will permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants at the sites. Thirty-five remedies involve containment components to address non-residual waste. Ground-water pump and treatment actions are components of 32 of the selected remedies. Finally, thirteen remedies provide for alternative water supplies, and seven recommend no futher action. (See section 2.3.8 of the Report for a more detailed explanation.)

EPA has taken several steps toward creating a full-scale program for the development and evaluation of permanent technologies (i.e., technologies that provide a permanent solution to contamination problems at a site) by initiating the SITE program and implementing one of its major components, the SITE demonstration program (DP). Two solicitations for technologies for the DP have been published -- the first, in February 1986, and the second, in January 1987. EPA is working with 11 technologies selected during 1986. One demonstration was completed and five more are planned.

New technologies were also generated by EPA activities not directed primarily toward this goal: treatability studies done as part of FSs at Superfund sites were undertaken to determine the comparative effectiveness of various remedies; the Superfund Technology Support Project (STSP), a technical assistance program, was initiated to encourage the use of new technologies; and a worldwide survey of treatment technologies was conducted. Also, in response to CERCLA's requirement to establish a program for a 5-year review of sites at which hazardous substances remain after completion of a remedial action, EPA developed a draft policy that is included in the proposed NCP.

The remedial program awarded two Field Investigation Team (FIT) contracts to provide support for the pre-remedial program. In addition, EPA awarded three contracts to minority business firms; two contracts to perform remedial response activities and one contract to provide remedial response for a specific site.

Program Management Initiatives

Two major remedial project management support activities were initiated this year:

(1) **The Alternative Remedial Contracts Strategy (ARCS).** ARCS will promote the continuity of contractor performance from RI/FS through construction management (or RA), increase the level of competition for contract awards, and facilitate the delegation of contract management to the Regions. Contract awards under this program in the two pilot Regions began in December 1987, and procurement actions will begin in the remaining Regions next year.

(2) **The RI/FS Improvements Initiative.** This effort has several objectives: (i) to contain project planning activities within a 3-month period after project initiation; (ii) to ultimately reduce the overall RI/FS process to an 18-month schedule; (iii) to reduce overall costs; and (iv) to improve the technical quality of RI/FSs. A report issued to the Regions on July 23, 1987 discussed several initiatives aimed at improving performance on RI/FS projects and proposed implementation strategies for improving project performance while concurrently streamlining the RI/FS schedule. These initiatives attempt to provide a realistic strategy for implementing a phased RI/FS schedule that would meet CERCLA objectives without requiring major changes to the remedial program.

Reorganization and reallocation of program responsibilities was another significant initiative during the year. Early in the year, in anticipation of the CERCLA amendments, EPA decided to restructure the Office of Emergency and Remedial Response (OERR) to improve management's ability to implement the new law, to focus efforts on meeting statutory goals and schedules, and to facilitate the drafting of major rules, such as the NCP and HRS revisions. EPA Regional offices have assumed an increasingly important role in the Superfund program as a result of increasing internal delegation of program responsibilities to the Regional level and expansion of computer capabilities for planning workloads and tracking program progress.

The removal program, supported by four zone ERCS contractors, developed several contracts initiatives that will be implemented over the next 2 years. EPA implemented a strategy for awarding smaller removal contracts, "mini-ERCS," on a Regional basis. EPA also plans to provide additional coverage by splitting one of the ERCS zones into two smaller zones and awarding a new contract for each of them.

Additionally, EPA is developing a new contracting approach (projected for FY89) that involves prequalifying contractors within each Region (or an even smaller geographical area) so that when a specific removal is required within a certain area, a contractor can be chosen from among the select group of prequalified firms in that area.

As noted earlier, EPA created a second generation CERCLIS by incorporating into CERCLIS part of the information and data contained in five different systems: CERCLIS (first generation); the Superfund Comprehensive Accomplishments Plan (SCAP); the Removal Tracking System; the Case Management System; and the Remedial/Removal Financial System Site File. The expanded CERCLIS is the national Superfund management, tracking, and reporting tool. Site-specific data files became fully operational on November 1, 1987, and, by January 1, 1988, CERCLIS was being used to track the SCAP and Agency-wide progress measures.

The SCAP is the planning mechanism that drives the allocation of resources for remedial activities. With the incorporation of the SCAP into the CERCLIS management system, the Regions became responsible for the planning and reporting that determine the adequacy of budgetary allotments and how Regional accomplishments are reported. To make the SCAP a better planning and site management tool, EPA used an integrated approach to SCAP development and maintenance, which was implemented in several ways:

- Target setting and reporting for Fund-financed activities and enforcement/PRP activities were combined;
- Uniform reporting formats combining removal, remedial, and enforcement information were developed;
- The enforcement case budget was integrated with the SCAP; and
- Regions began planning the use of Technical Enforcement Support contract and interagency agreement resources on a

site-specific basis, the basis on which remedial activities are planned.

Finally, senior OSWER management and staff have spent a significant amount of time identifying and resolving the complex issues raised by integrating the Resource Conservation and Recovery Act (RCRA) and CERCLA programs in response to the requirements of CERCLA section 121, which recognizes the significant impact the regulations and policies established for one program can have on the other. Their efforts will be reflected in both the NCP proposal and forthcoming manual on Superfund compliance with other laws. The current focus of the RCRA/CERCLA Task Force is the proposed RCRA section 3004 corrective action rule.

Other Implementation Activities

EPA took a number of actions with regard to Federal facilities. EPA added 32 Federal facilities to the NPL, the first Federal facilities to be included, and another 16 were proposed for listing. In addition, EPA, the U.S. Department of the Army, and the State of Minnesota signed the first Interagency Agreement. EPA also established the Federal Facilities Task Force, which works with States and EPA Regional offices to ensure that Federal facilities comply with the section 120 provision that Federal facilities satisfy applicable CERCLA and RCRA requirements. EPA has 16 facilities subject to this provision and began in FY87 to prepare its Report to Congress on progress made to bring the facilities into compliance with the provisions of section 120.

EPA established the Federal Agency Hazardous Waste Compliance Docket to make information available to the public about Federal facilities and to give notice of CERCLA actions concerning Federal facilities. The initial docket listed 1,094 facilities. In accordance with the 1987 Executive Order 12580, Federal departments and agencies are responsible for conducting PA/SIs of the Federal facilities they own or operate. EPA established a deadline of April 17, 1988, for submission of Federal facility pre-remedial activity reports. Also, EPA proposed regulations implementing section 120 restrictions on the transfer of U.S. government property on which a hazardous substance was released, disposed of, or stored for a year or more.

Much of the Superfund program is implemented through contract services, and EPA is continuing efforts to increase the proportion of contract dollars that is awarded to minority firm contractors. This year the value of the minority firm share of Superfund contract dollars was $38,000,000, which is 6 percent of the $603,900,000 total obligated during the year. Of the total, direct procurement contracts represented $31,300,000 (9 percent of the total dollars awarded); the share of cooperative agreement dollars awarded was $2,100,000 (22 percent); and the share of interagency agreement dollars was $4,600,000 (2 percent).

During the fiscal year, EPA conducted several activities to promote the participation of minority firms. The Office of Small and Disadvantaged Business Utilization (OSDBU) sought the assistance of the Minority Business Development Agency (MBDA) of the Department of Commerce. EPA issued information on contracting processes and held conferences, seminars, and training workshops to inform minority firms about Superfund contracting opportunities. Also, other

Federal departments and agencies involved in the Superfund program were encouraged to increase awards to minority firms. EPA requires these departments and agencies to submit reports on contracts that have been awarded.

EPA Superfund implementation activities are funded from the Hazardous Substance Trust Fund. Executive branch departments and agencies other than EPA use two sources of funding to implement Superfund activities: the Trust Fund and monies budgeted independently of Superfund as part of the President's annual budget submission. During the fiscal year, EPA expended a total of $1,050,748,900 in Trust Fund monies for CERCLA implementation, including SARA Title III activities. Other Federal departments and agencies spent $478,193,900 to fund the implementation of their Superfund activities, including $66,148,000 in Trust Fund monies transferred via the EPA Superfund Interagency Budget and site-specific interagency agreements.

Congress provided EPA with $3,964,000,000 in budget authority for the implementation of CERCLA, as amended, for the 3-year fiscal period 1987 through 1989. The actual level of funds obligated annually may be slightly less than the level of budget authority provided. EPA is working to collect the data necessary to include estimates for completion of CERCLA requirements in the FY88 Report to Congress. EPA is also developing an estimate of unfunded liability beyond 1991 for projects currently in the remedial pipeline. In FY88, the Agency's ability to forecast costs should be improved by promulgation of the proposed NCP and by gaining another year's experience in implementing the provisions that SARA added to CERCLA. Better coordination with other agencies and departments also should help refine projections.

Finally, EPA participated in four Congressional hearings before the Senate Environment and Public Works Committee on Superfund implementation. No implementation hearings were held by House committees.

Statutory Deadlines and Report Requirements

Congress imposed seven deadlines on EPA in FY87 through provisions added to CERCLA by SARA. EPA met two of these deadlines: promulgating revisions to RQ regulations under section 102(a), and soliciting innovative technologies for research and development as required by section 311(b)(5)(B). The following were not submitted to Congress by their respective deadlines: this Report on CERCLA implementation progress, required by section 301(h)(1); the report on progress in the research, development, and demonstration programs, required by section 311(e); and the study on hazardous waste sites on Indian lands, required by section 126(c). All of these reports have now been submitted.

Also, statutory deadlines established for promulgating procedures to notify local and State officials and other interested persons of limitations on the payment of claims under section 111(o) and for submitting a report to Congress under section 120(e)(5) on implementing CERCLA at EPA facilities were not met.

In addition to providing an overview of EPA FY87 progress in implementing CERCLA, this Report includes the following information specifically required by CERCLA sections 301(h)(1)(A) through (G), 105(f), and 301(h)(2):

- In response to the requirement of section 301(h)(1)(A), Appendix C contains a detailed description of each feasibility study completed during FY87.

- The status and estimated date of completion of each feasibility study and remedial and enforcement action, required by section 301(h)(1)(B) and (F), are summarized in section 2.4. Detailed information is given in Appendix D, which also contains information on feasibility studies, remedial investigations and, as required by 301(h)(1)(C), remedial actions that will not meet previously established schedules. It also includes a new estimate of time of completion. The status of enforcement actions and a comparison of FY87 remedial and enforcement actions with those undertaken in previous years, required by 301(h)(1)(F), is included in section 2.3.9.

- The evaluation of newly developed technologies required by section 301(h)(1)(D) is described in Chapter 7.

- A discussion of the progress made in reducing the number of facilities subject to 5-year reviews under section 121(c), required by section 301(h)(1)(E), is included in section 2.5. Section 2.5 also contains information that satisfies the requirements of section 121(c) to report to Congress: (1) a list of facilities for which such a review is required; (2) the results of such reviews; and (3) any actions taken as a result of such reviews.

- The resource estimates for completion of CERCLA implementation, required by section 301(h)(1)(G), are included in Chapter 13.

- Chapter 11 satisfies the section 105(f) requirement that EPA describe the participation of minority firms in contracts carried out under CERCLA.

- The report conducted under section 301(h)(2) by the EPA Inspector General on the reasonableness and accuracy of this Report to Congress is found in Appendix F.

2.0 RESPONDING TO RELEASES OF HAZARDOUS SUBSTANCES

CERCLA gives the Federal government authority to respond to uncontrolled releases of hazardous substances and to develop long-term solutions to the nation's gravest hazardous waste problems. CERCLA provides for a broad program of reporting, investigation, and response to releases or threats of releases of any hazardous substance, or of any pollutant or contaminant that may present an imminent and substantial danger to public health, welfare, or the environment.

2.1 Notification and Reporting of Hazardous Substances

2.1.1 Overview

Sections 103(a) and 103(b) of CERCLA require that persons in charge of vessels or facilities from which a hazardous substance is released in quantities equal to or greater than its RQ immediately notify the National Response Center (NRC).*

Section 102(b) of CERCLA establishes one pound as the standard RQ for all releases of hazardous substances, except those for which RQs were established pursuant to section 311 of the Clean Water Act. Section 102(a) authorizes the Administrator of EPA to adjust all of these RQs by regulation, thereby allowing the Federal government to focus its resources on those releases that are most likely to pose potential threats to public health and welfare and the environment.

Under section 103(f)(2) of CERCLA, the reporting requirements for certain continuous releases of hazardous substances may be less stringent than those otherwise specified under sections 103(a) and (b). Section 103 of CERCLA also provides a reporting exemption for federally permitted releases, which are defined as releases permitted under certain other State or Federal programs.

2.1.2 Past and Ongoing Activities

On May 25, 1983, EPA proposed a rule to clarify procedures for reporting releases of CERCLA hazardous substances and to adjust RQs for 387 CERCLA hazardous substances (48 *FR* 23552). The May 25, 1983, Notice of Proposed Rulemaking (NPRM) also compiled for the first time the list of hazardous substances defined under section 101(14) of CERCLA. On April 4, 1985, EPA promulgated a final rule that clarified reporting procedures and finalized RQ adjustments for 340 hazardous substances (50 *FR* 13514). On September 29, 1986, EPA promulgated RQ adjustments for an additional 102 hazardous substances (50 *FR* 34534).

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* The NRC has the capability to accept release notifications on a 24-hour basis. Its national toll-free number is (800) 424-8802; in the Washington, D.C. metropolitan area, the number is (202) 267-2675.

2.1.3 Progress in Fiscal Year 1987

On March 16, 1987, EPA published two proposed rules to adjust the statutory RQs for CERCLA potential carcinogens and radionuclides (52 *FR* 8140 and 52 *FR* 8172). Substantial effort during the fiscal year culminated in several rulemakings after the close of FY87. On March 2, 1988, EPA published a proposed rule to adjust the RQs for lead and lead compounds and to delist ammonium thiosulfate as a CERCLA hazardous substance (53 *FR* 6762). A proposed rule explaining the scope of the reduced reporting requirement for continuous releases was issued on April 19, 1988 (53 *FR* 12868). Also, the Agency published a rule on the reporting exemption for federally permitted releases (53 *FR* 27268, July 19, 1988).

On October 1, 1987, the Emergency Response Notification System (ERNS) became operational. Notifications of releases reported directly to EPA Regional offices and to the U.S. Coast Guard district offices are now entered electronically into a central data base, along with NRC reports. ERNS provides EPA with a more comprehensive perspective on release notifications nationwide.

2.2 The Removal Program

2.2.1 Overview

Removal actions, authorized under CERCLA section 104(a), are generally short-term actions intended to respond to near-term threats to human health and the environment. In some cases where additional response action is otherwise appropriate, removal actions serve to protect the public and the environment until a long-term solution can be instituted; in others, the removal action suffices as the solution to the problem.

Removal actions may include the following activities: treatment, excavation, pumping, incineration, barrier installation, provision of an alternate water supply, or temporary relocation of residents. Superfund-financed removals can be conducted at both National Priorities List (NPL) and non-NPL sites. Removal actions also may be conducted and financed by potentially responsible parties (PRPs).

SARA mandated two significant changes in the removal program. First, SARA amended CERCLA section 104(c), increasing the limits on removal actions from 6 months and $1,000,000 to 1 year and $2,000,000. A new exemption to these limits can apply when "continued response action is otherwise appropriate and consistent with the remedial action to be taken." Second, CERCLA section 104(a), as amended, requires that a removal action contribute, to the extent practicable, to the efficient performance of a long-term remedial action. EPA issued guidance in April 1987 to implement the section 104(a) provision and the section 104(c) statutory exemptions. During FY 1987, EPA approved 23 exemptions to the statutory time limit and 11 exemptions to the $2,000,000 ceiling.

2.2.2 Progress in Fiscal Year 1987

The Agency initiated a total of 254 Fund-financed removal action starts and restarts and 195 removal actions were completed using Superfund resources in FY87. This is the second largest number of completions since the program began in December 1980. The enforcement program issued 67 administrative orders for removals, and PRPs started an additional 50 removals and completed 31. Removal action settlements climbed to 57, totaling more than $27,000,000. At 10 facilities, PRPs undertook independent response actions. A total of 85 removal sites were cleaned up during the year; 83 were Fund-financed, and two were financed by PRPs. A site is determined to be cleaned up when no further action is anticipated. Exhibit 2.2-1 lists, by State, the number of removals financed by Superfund.

2.2.2.1 Polychlorinated Biphenyl (PCB) Removals

Removals conducted in response to PCB and/or dioxin contamination during FY87 comprised 20 percent of total removals. PCBs were found in soil or oil; dioxin contamination was usually found only in soil.

In early 1987, PCB compounds were discovered in 68 disposal pits along natural gas pipelines owned by a private company. In response, EPA appointed a national task force to investigate the disposal practices of the interstate natural gas pipeline industry. The task force initiated several actions:

- A nationally coordinated effort to identify other pipeline companies using earthen disposal pits;

- Preliminary site assessments to determine whether there was any immediate need for removal actions; and

- Enforcement negotiations with PRPs to compel them to clean up any contamination.

The task force ultimately identified a total of 78 sites requiring preliminary site assessments. In all cases, the PRPs undertook the removal actions.

2.2.2.2 The 1000th Removal -- Moreland Site

EPA initiated the 1000th Superfund emergency removal action in August 1987 at the Moreland site in Commack, New York. The Moreland site typifies EPA's emergency removal actions.

On July 24, 1987, the New York State Department of Environmental Conservation (NYSDEC) alerted EPA to two leaking cylinders in a field outside of Commack, New York. After consulting a cylinder specialist and conferring with the manufacturer, EPA determined that the cylinders contained hydrogen fluoride, a highly corrosive substance often fatal to humans when inhaled. One of the cylinders was leaking through the valve assembly, and the other was leaking through pinholes in its base. The release of the cylinders' contents

Exhibit 2.2-1

Fiscal 1987 Removals By State

		Fund-Financed	
Region	State	Starts	Completions
Region 1	Connecticut	3	3
	Maine	3	2
	Massachusetts	9	7
	New Hampshire	6	3
	Rhode Island	1	0
	Vermont	1	1
	Total	23 (5)	16 (3)
Region 2	New Jersey	9	8
	New York	25	19
	Puerto Rico	1	1
	Virgin Islands	1	1
	Total	36 (8)	29 (5)
Region 3	Delaware	5	3
	Maryland	4	1
	Pennsylvania	21	17
	Virginia	3	6
	West Virginia	13	6
	Total	46 (5)	33 (4)
Region 4	Alabama	3	3
	Florida	5	4
	Georgia	12	11
	Kentucky	6	4
	Mississippi	3	1
	North Carolina	16	13
	South Carolina	3	4
	Tennessee	2	1
	Total	50 (8)	41 (4)
Region 5	Illinois	2	3
	Indiana	7	12
	Michigan	10	5
	Minnesota	1	0
	Ohio	8	5
	Wisconsin	7	5
	Total	35 (8)	30 (9)

Exhibit 2.2-1
(continued)

Fiscal 1987 Removals By State

Region	State	Fund-Financed Starts	Fund-Financed Completions
Region 6	Arkansas	4	3
	New Mexico	1	1
	Oklahoma	0	1
	Texas	13	12
	Total	18 (4)	17 (3)
Region 7	Iowa	2	1
	Kansas	1	2
	Missouri	9	6
	Nebraska	0	1
	Total	12 (-)	10 (1)
Region 8	Colorado	9	3
	North Dakota	0	1
	South Dakota	1	0
	Wyoming	1	0
	Total	11 (2)	4 (2)
Region 9	Arizona	3	1
	California	10	10
	Guam	0	0
	Hawaii	1	1
	Nevada	1	0
	Total	15 (4)	12 (3)
Region 10	Idaho	2	0
	Oregon	1	1
	Washington	5	2
	Total	8 (1)	3 (-)
Program Total		254 (45)	195 (34)

( ) = NPL sites.

Source: Removal Tracking System (RTS) Report of November 9, 1987.

presented an imminent and substantial danger to public health and the environment.

EPA began the removal action on July 24, 1987 by mobilizing the Emergency Removal Cleanup Services personnel and stabilizing the two cylinders in two overpack drums filled with lime. On July 30 and 31 and August 1 and 2, 1987, EPA emptied the two cylinders by allowing their contents to gravity feed into an in-ground reactor vessel on site. On August 11, 1987, the empty cylinders were shipped back to their manufacturer in Cleveland, Ohio, for dismantling. The removal action was officially completed on September 3, 1987, when the reactor vessel was removed.

2.2.2.3 The Environmental Response Team

The Environmental Response Team (ERT) provides training to Regions and States, as well as technical support for difficult or unusual removal and remedial actions. Regional offices may request the ERT's assistance if the Region determines that additional technical expertise is required to remove or remediate a spill or other site contamination. The ERT assisted all 10 Regional CERCLA and RCRA offices with 195 instances of spills or site contamination. In particular, the ERT provided support for the air monitoring conducted in the Love Canal Habitability Study; the site-safety plan negotiations at the Bloomington, Indiana, PCB site; the innovative technology demonstration at the Peak Oil Site in Tampa, Florida; and the remedial activities for ground-water contamination at the North Road site in Reeders, Pennsylvania.

During FY87, the ERT presented approximately 100 training courses to over 3,500 EPA, State, and local employees. Topics discussed include site safety; sampling methods (air and other media); first response; incident mitigation; and ground-water treatment methods.

2.2.2.4 Monitoring of Removal Activities

When CERCLA funds are not used, EPA oversees the cleanup activities of PRPs, States, localities, or other parties to ensure that adequate cleanup takes place. By the end of FY87, EPA had conducted on-site monitoring for 422 cleanup actions involving hazardous substances.

2.2.2.5 Policy and Guidance

During FY87, EPA issued seven policy and guidance documents to guide removal program actions:

- Interim final guidance on State-lead removal actions (Guidance for State-Lead Removal Actions, OSWER Directive #9375.1-4-W, July 10, 1987). This guidance sets forth the policy and procedures for awarding to States the authority and funds necessary to lead a CERCLA-funded removal action. The guidance is intended to provide EPA Regions with a new management tool for handling their workload and will serve as a mechanism for the further sharing of program responsibilities via cooperative agreements with States.

Under this program, States may lead all, or part of, non-time-critical removal actions at NPL and non-NPL sites.

- Interim guidance specifying criteria and procedures for use of the consistency exemption provided in CERCLA section 104(c), which allows a removal action to continue beyond the $2,000,000, 12-month statutory limits if continued response action is "otherwise appropriate and consistent with the remedial action to be taken" (April 1987).
- Interim guidance on meeting the requirement of CERCLA section 104 that removals contribute to efficient performance of long-term remedial action (April 1987).
- Interim final guidance regarding new drinking water action levels, including a new decision model to determine whether conditions at a site warrant removal action (October 1987).
- Guidance summarizing the land disposal restrictions under Resource Conservation and Recovery Act (RCRA) section 3004 for the remedial program, and addressing the treatment of Superfund removal wastes prior to land disposal (August 1987).
- Draft guidance on the use of alternative technologies in remedial response -- to encourage and facilitate the use of alternatives to land disposal in the conduct of removal actions (May 1987).
- Draft guidance on engineering evaluation/cost analyses, which are performed to assess alternative removal actions in terms of their appropriateness, feasibility, and cost effectiveness (June 1987).

2.2.3 Status of Removal Activities in Fiscal Year 1987 Compared with 1981-86

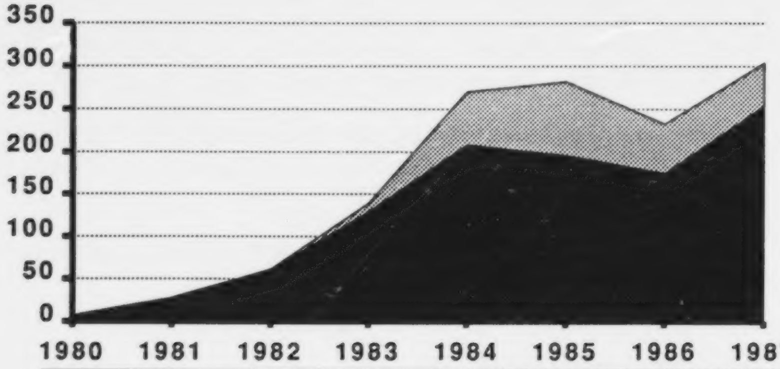
Since the beginning of the Superfund program, the number of completed removals has jumped from 18 in FY81 to a high of 201 in FY84. In FY87, EPA completed 195 removal actions. A several-month delay in receiving the 1987 appropriation caused a reduction of the number of new starts and completed removals (see Exhibit 2.2-2).

The type of completed removals has varied over time (see Exhibit 2.2-3). In FY84, 63 (31 percent) of all Fund-financed removals occurred at inactive waste management facilities. During FY87, 37 (19 percent) of all removals occurred at inactive waste management facilities. Transportation-related removals have dropped from 7 (3.5 percent) of all removals in FY84 to zero in FY87. Forty-eight of the FY84 and 53 of the FY87 removals were in response to midnight dumping.

Exhibit 2.2-2

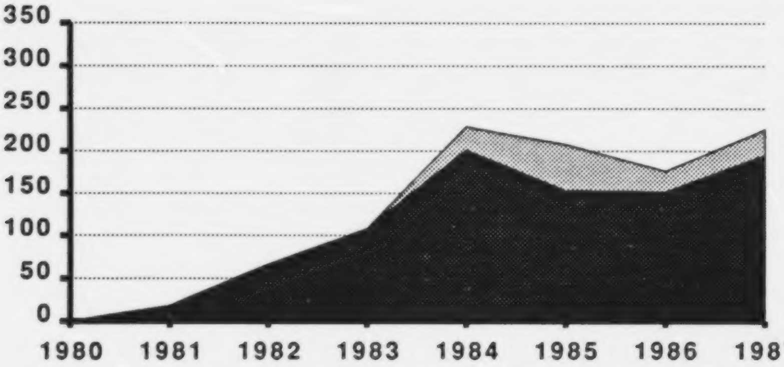
Removal Actions by Fiscal Year

Starts



	1980	1981	1982	1983	1984	1985	1986	1987	Total
▨ PRP* Financed	0	0	1	10	62	86	58	50	267
■ Fund Financed	7	28	60	129	208	196	175	254	1,057
Total	7	28	61	139	270	282	233	304	1,324

Completions

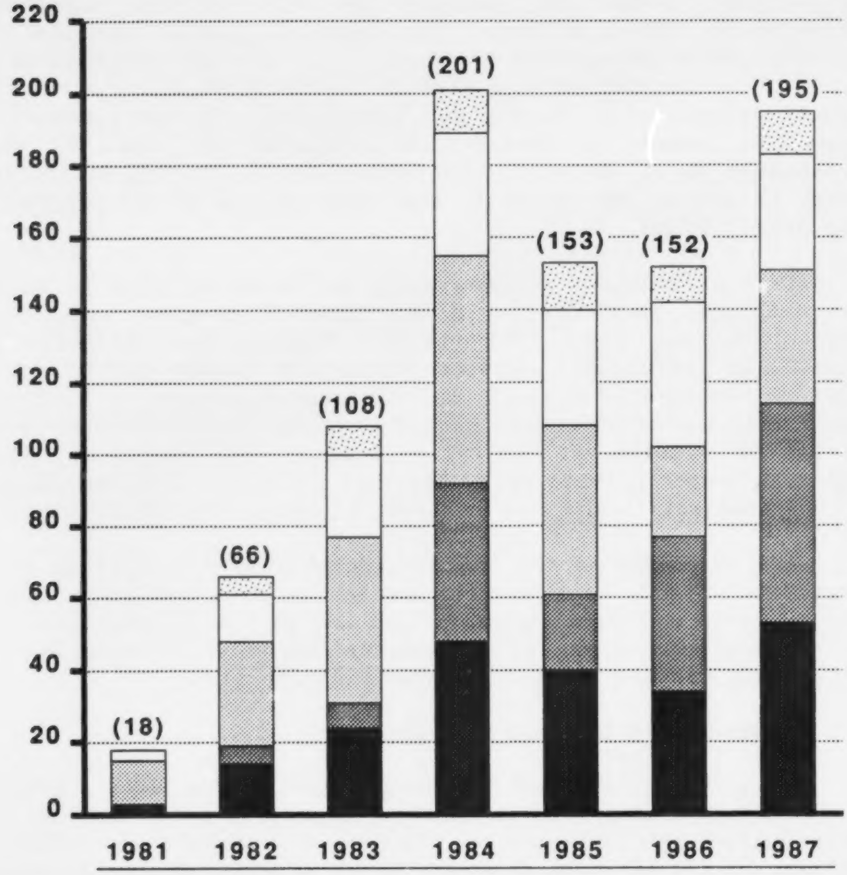


	1980	1981	1982	1983	1984	1985	1986	1987	Total
▨ PRP* Financed	0	0	1	0	28	55	24	31	139
■ Fund Financed	0	18	66	108	201	153	152	195	893
Total	0	18	67	108	229	208	176	226	1,032

* PRP = potentially responsible party.

Exhibit 2.2-3

Completed Removals By Incident Category



	1981	1982	1983	1984	1985	1986	1987
░ **Active Production Facility**	0	5	8	12	13	10	12
☐ **Inactive Production Facility**	3	13	23	34	32	40	32
▒ **Inactive Waste Management Facility**	12	29	46	63	47	25	37
▓ **Other**	1	5	7	44	21	43	61
■ **Midnight Dump**	2	14	24	48	40	34	53

Note: The "Other" category includes transportation-related incidents, active waste management facilities, and miscellaneous incidents.

2.3 The Remedial Program

2.3.1 Overview

A "remedial action" is a longer-term cleanup action intended to address non-emergency situations and problems more complex than those that can be addressed by removal actions. The Remedial Program consists of activities that fall into three categories or phases: (1) the pre-remedial phase, in which the extent of contamination at a site is assessed and those sites that represent the highest priority for cleanup are identified; (2) the remedial action phase, in which the remedy is designed and implemented; and (3) the operation and maintenance phase, in which site upkeep and monitoring activities occur with the remedy in place. The steps in the three phases of the program are described in more detail below.

EPA's enforcement program plays an important role in maximizing Superfund site cleanups, particularly in the remedial program context. The enforcement program has two major components: negotiating voluntary settlements with potentially responsible parties (PRPs) and taking enforcement actions against PRPs. A fundamental goal of the enforcement program is to facilitate voluntary settlements with PRPs. When settlement negotiations do not result in agreement, EPA has two alternative courses of action. The Agency may take an enforcement action to compel private party cleanup, or it may use Superfund money to finance a government action and seek recovery of such costs from PRPs through the courts.

SARA strengthened the enforcement program by codifying the existing CERCLA settlement policy, establishing new authorities and procedures that facilitate private-party and Fund cleanups, and adding new authorities for imposing civil and criminal penalties for failure to comply with the statutory provisions of CERCLA that pertain to notification and reporting.

2.3.2 Inventory of Hazardous Substance Releases

EPA's CERCLA Information System (CERCLIS) includes a national inventory of all hazardous waste sites potentially appropriate for listing on the NPL. Sites are proposed for inclusion on the NPL as a result of citizen's petitions, an incident at the site, or observation by Federal, State, or local officials.

Progress in Fiscal Year 1987

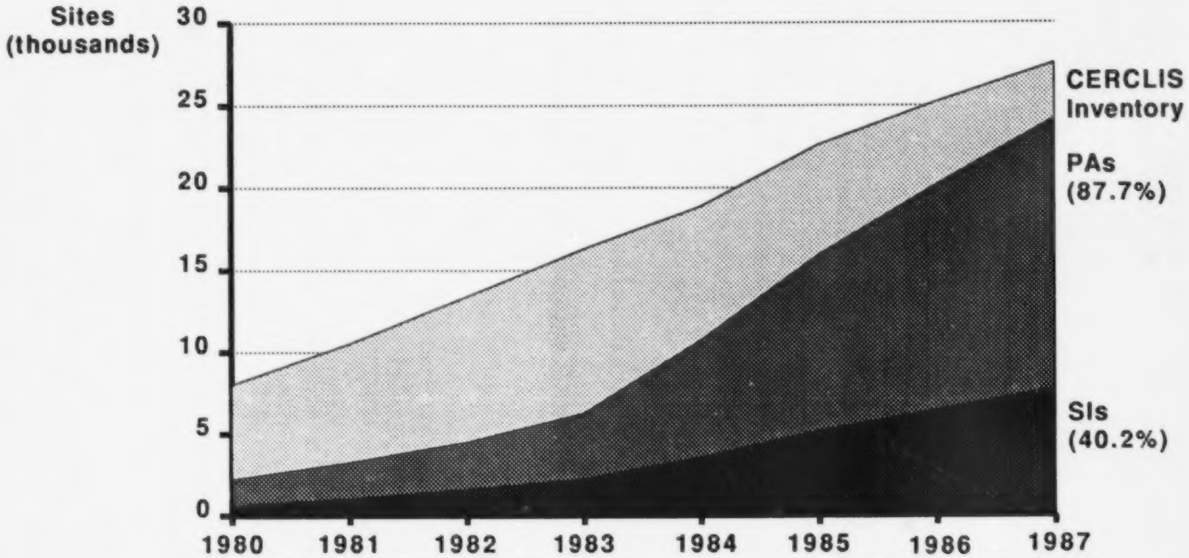
From FY80 through FY86, the number of sites included in CERCLIS grew from 8,000 to 25,194. At the end of FY87, 27,571 sites were inventoried, an increase of 2,377 sites from October 1986. The annual number of sites in the inventory from FY80 through FY87 is shown in Exhibit 2.3-1.

2.3.3 Preliminary Assessments

For each site in the inventory, EPA uses existing information to evaluate the magnitude of the potential hazard at a site, identify the source and the nature of the release, and identify any potentially responsible parties. Based on the results of this preliminary assessment (PA), EPA determines if the site merits further investigation. The PA does not normally include a site visit or

Exhibit 2.3-1

Historical Superfund Pre-Remedial Program Accomplishments



	1980	1981	1982	1983	1984	1985	1986	1987
░ Sites in CERCLIS Inventory	8,000	10,500	13,386	16,309	18,884	22,621	25,194	27,571
▓ Preliminary Assessments (PAs) Completed	2,204	1,072	1,209	1,809	4,447	5,181	4,262	4,001
Total to Date	2,204	3,276	4,485	6,294	10,741	15,922	20,184	24,185
Percent Completed*	27.6	31.2	33.5	38.6	56.9	70.4	80.1	87.7
■ Site Investigations (SIs) Completed	613	428	566	642	1,308	1,618	1,267	1,343
Total to Date	613	1041	1,607	2,249	3,557	5,175	6,442	7,785
Percent Completed**	34.8	39.7	44.8	44.7	41.4	40.6	39.9	40.2

* Total completed PAs compared to CERCLIS Inventory.

** Total completed SIs compared to sites determined to require an SI.

sampling. CERCLA section 105(d) specifies that any individual may petition EPA to perform a PA and that EPA has up to one year to respond to the petition.

Progress in Fiscal Year 1987

Between FY80 and the end of FY87, 24,185 PAs were conducted; 4,001 PAs were completed in FY87. The annual number of PAs conducted from FY80 through FY87 are shown in Exhibit 2.3-1.

EPA met the CERCLA section 116 goal for completing PAs by January 1, 1988, at those sites in CERCLIS as of October 17, 1986. The Agency also developed a strategy in FY87 to modify the PA to identify more effectively those sites that require site inspections (SIs). This strategy includes increasing the level of effort for an average PA from 50 hours to approximately 75 hours to include activities such as off-site reconnaissance, and the application of technical evaluation criteria, professional judgment, and other technical factors for assigning priority to sites needing SIs. Revisions to the guidance on conducting PAs were made in FY87 to incorporate this strategy. The new PA guidance will be released to Regions in the second quarter of FY88.

EPA expects that it can meet the requirements of CERCLA section 105(d) for completing PA petitions within 12 months of their receipt and has developed guidance on this requirement. EPA Regional offices report fewer than 20 PA petitions were received during FY87.

2.3.4 Site Inspections

Site Inspections (SIs) are performed at sites where PAs indicate that additional studies are warranted to evaluate potential hazards. On average, in a given year, approximately 80 percent of PAs have indicated the need for an SI. The SI consists of a visual inspection of the site and usually includes collection and chemical analysis of a limited number of samples of environmental media, e.g., soil, surface water, or ground water. There are several major purposes for a SI: (1) to determine which releases pose no current or potential threat to public health and the environment; (2) to determine if there is any immediate threat to persons living or working near the release that might necessitate an immediate removal action; and (3) to collect data, where appropriate, to determine whether the site should be included on the NPL.

Progress in Fiscal Year 1987

Between FY80 and the end of FY87, 7,785 SIs were completed, with 1,343 completed in FY87 alone. The annual number of SIs conducted from FY80 through FY87 is shown in Exhibit 2.3-1.

Under section 116, SIs (where warranted) are to be conducted by January 1989 for all sites in CERCLIS as of October 17, 1986. Although the Agency does not believe it will be able to achieve this goal, guidance was developed in FY87 to enable the Agency to devote more resources to those sites most likely to be proposed for the NPL. The guidance also includes details on new aspects of the

SI necessary to support the revised HRS that the Agency is proposing. The revised guidance will be sent to the Regions in FY88.

2.3.5 Hazard Ranking System

The Hazard Ranking System (HRS) was designed to be a screening tool that would allow EPA to rank sites quickly using data and information from the SI. The current HRS score is a reflection of a site's potential to cause harm to human health or the environment, as a result of the migration of hazardous substances through ground water, surface water, or air. The overall HRS score is a composite of separate scores for each of these contaminant migration routes. The score for each route is obtained by assigning numerical values (according to prescribed guidelines) to a set of factors that characterize the potential of the release to cause harm. Sites with HRS scores of 28.50 or greater are eligible for inclusion on the NPL. The 28.50 threshold value was initially chosen to yield an NPL of at least 400 sites, as originally required by CERCLA, not because it represents any threshold in the significance of the risks presented by sites. EPA is reviewing the effect of this threshold, and may change it as a result of the revisions that are now being made to the HRS methodology.

CERCLA, as amended by SARA, mandates that EPA's revision of the HRS should be guided by certain specific criteria. Section 105 requires EPA to amend the HRS to ensure "to the maximum extent feasible, that the HRS accurately assesses the relative degree of risk to human health and the environment posed by sites and facilities subject to review." Section 105 also directed EPA to consider a number of specific factors in its review of the HRS: the effect that contamination of surface water has on the use of that water for drinking and recreational purposes and the threat that contamination poses to the human food chain and to ambient air. Section 118 directs EPA to assign a high priority to facilities whose releases have led to the closing of drinking water wells or to contamination of a principal drinking water supply. Section 125 requires EPA to assess a number of factors in relation to the scoring of sites containing fly ash wastes.

Progress in Fiscal Year 1987

In FY87, the Agency began revising the HRS to comply with CERCLA requirements. The revised HRS will be proposed in early FY89. To facilitate the revision process, an HRS revisions workgroup was established and met monthly during most of the fiscal year. A testing program was implemented to evaluate sites according to the revised HRS and three other site evaluation systems. EPA also convened a site-ranking panel to evaluate and rank 20 sites according to their perceived risk levels. This exercise was conducted to obtain expert judgments to serve as the baseline with which to compare site evaluation models and to gain a better understanding of the relative weights that should be assigned to certain factors. The workgroup also prepared an economic impact analysis of the proposed revisions to the HRS, and planned procedures for the field testing of the revised HRS that EPA will conduct in FY88.

2.3.6 Listing on the National Priorities List

The main purpose of the National Priorities List (NPL) is to identify sites that appear to present a significant risk to public health or the environment. The National Contingency Plan (NCP) establishes that a site must be placed on the NPL before it can undergo Fund-financed remedial action. The NPL does not, however, determine priorities for removal actions; EPA may take removal actions at any site, whether listed or not, if the site meets the criteria in section 300.65(b) of the 1985 NCP. Likewise, EPA may take enforcement actions under CERCLA against PRPs regardless of whether a site is on the NPL. As a practical matter, however, the focus of EPA's enforcement actions has been on NPL sites.

EPA follows the Administrative Procedure Act (APA) rulemaking procedures to add sites to the NPL. These procedures involve proposing sites in the *Federal Register*, soliciting comments on the proposals, and publishing a list of sites ultimately chosen for inclusion on the NPL in the *Federal Register*.

Progress in Fiscal Year 1987

At the end of FY86, 703 sites were listed on the NPL and an additional 184 sites had been proposed for inclusion. In January 1987, EPA proposed 64 sites for inclusion on the NPL. The proposed update included one Federal facility site and sites located in 24 of the 50 States, the District of Columbia, and 6 territories. In July 1987, 99 sites (including 32 Federal facilities) were added, bringing the total number of sites on the NPL to 802, with an additional 149 sites proposed for inclusion.

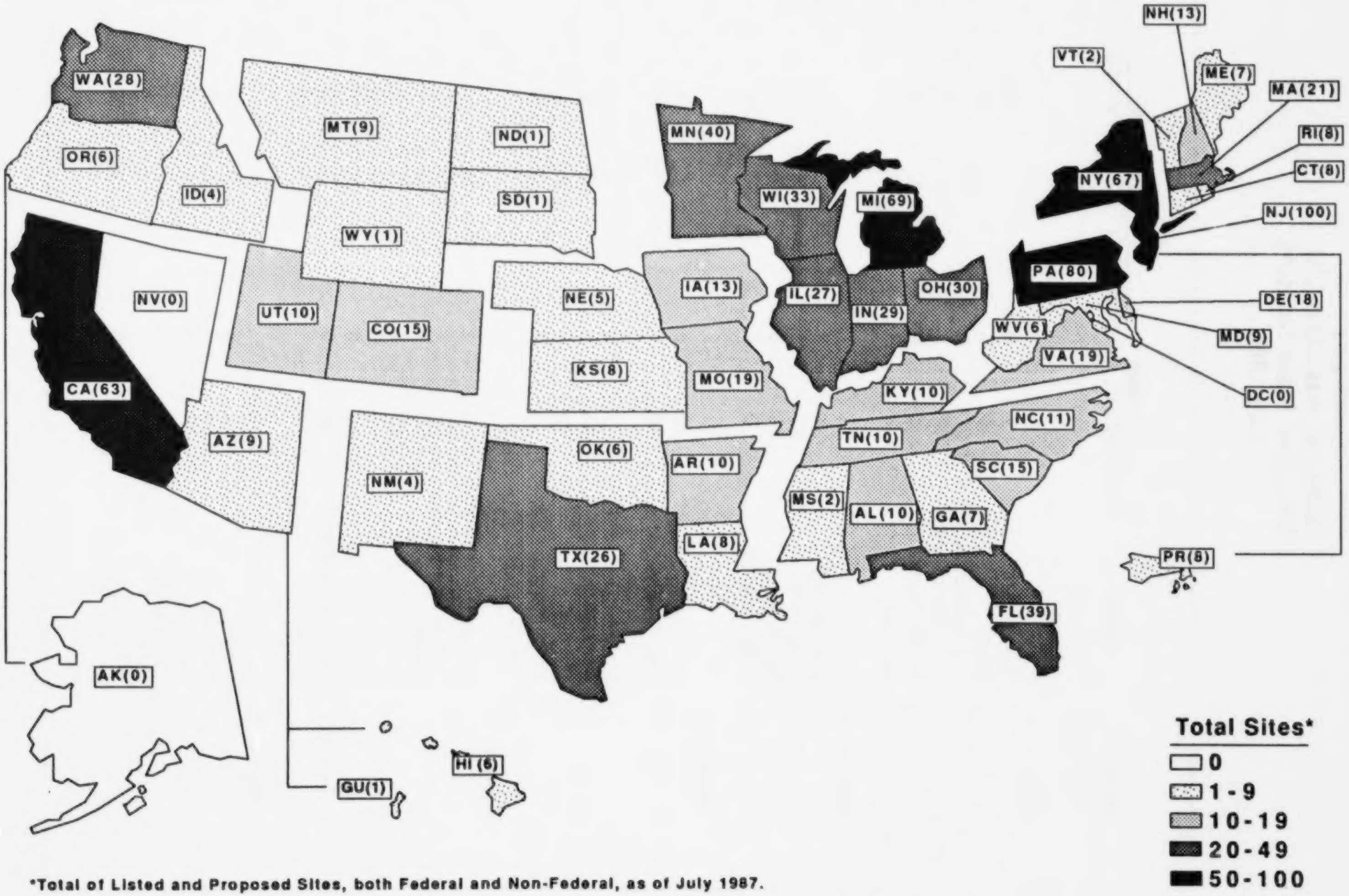
Of the States and Territories, eight had no sites listed on the NPL as of July 1987: Alaska, American Samoa, the Commonwealth of the Northern Mariana Islands, the District of Columbia, Hawaii, Nevada, the Trust Territory of the Pacific Islands, and the Virgin Islands. New Jersey had the largest number of listed sites (96), followed by New York (63), Pennsylvania (61), Michigan (58), and California (48). The map in Exhibit 2.3-2 shows the location of all NPL sites. Exhibit 2.3-3 shows the number of listed Federal and non-Federal NPL sites and proposed sites in each State, as of July 1987. The number of sites that have been added to the NPL each year from FY83 through FY87 is shown in Exhibit 2.3-4. During FY87, the Agency also began work on Update 7 and, on June 24, 1988, proposed 229 new sites, including 14 Federal sites, for NPL listing (53 *FR* 23988).

2.3.7 Remedial Investigation and Feasibility Study

During the remedial investigation (RI), data are collected on all aspects of the site, including the geologic and hydrologic characteristics of the site, the nature of the on-site contaminants, and the characteristics and proximity of the population near the site. Numerous samples of air, ground water, surface water, soil, and contaminants are analyzed. A Superfund Public Health Assessment based on these data determines the risks posed to human health and the environment by the site contamination.

Exhibit 2.3-2

Map of National Priorities List Sites


WA(28)
OR(6)
ID(4)
MT(9)
ND(1)
SD(1)
WY(1)
NV(0)
CA(63)
UT(10)
CO(15)
AZ(9)
NM(4)
NE(5)
KS(8)
OK(6)
TX(26)
MN(40)
IA(13)
MO(19)
AR(10)
LA(8)
WI(33)
IL(27)
MI(69)
IN(29)
OH(30)
KY(10)
TN(10)
MS(2)
AL(10)
GA(7)
FL(39)
SC(15)
NC(11)
VA(19)
WV(6)
PA(80)
NY(67)
VT(2)
NH(13)
ME(7)
MA(21)
RI(8)
CT(8)
NJ(100)
DE(18)
MD(9)
DC(0)
PR(8)
AK(0)
HI(6)
GU(1)
Total Sites*
0
1-9
10-19
20-49
50-100

*Total of Listed and Proposed Sites, both Federal and Non-Federal, as of July 1987.

Exhibit 2.3-3

National Priorities List Sites Per State/Territory July 1987

Region	State	Listed Non-Federal	Listed Federal	Proposed Non-Federal	Proposed Federal	Total
Region 1						
	Connecticut	7	0	1	0	8
	Maine	5	1	1	0	7
	Massachusetts	21	0	0	0	21
	New Hampshire	13	0	0	0	13
	Rhode Island	8	0	0	0	8
	Vermont	2	0	0	0	2
Region 2						
	New Jersey	94	2	3	1	100
	New York	62	1	4	0	67
	Puerto Rico	8	0	0	0	8
	Virgin Islands	0	0	0	0	0
Region 3						
	Delaware	12	0	5	1	18
	District of Columbia	0	0	0	0	0
	Maryland	7	0	0	2	9
	Pennsylvania	60	1	17	2	80
	Virginia	10	1	8	0	19
	West Virginia	5	0	1	0	6
Region 4						
	Alabama	8	1	0	1	10
	Florida	34	0	5	0	39
	Georgia	3	1	3	0	7
	Kentucky	10	0	0	0	10
	Mississippi	2	0	0	0	2
	North Carolina	9	0	2	0	11
	South Carolina	12	0	3	0	15
	Tennessee	8	1	1	0	10
Region 5						
	Illinois	15	2	8	2	27
	Indiana	24	0	5	0	29
	Michigan	58	0	11	0	69
	Minnesota	39	1	0	0	40
	Ohio	28	0	2	0	30
	Wisconsin	32	0	1	0	33

Exhibit 2.3-3
(continued)

National Priorities List Sites Per State/Territory July 1987

Region	State	Listed		Proposed		Total
		Non-Federal	Federal	Non-Federal	Federal	
Region 6						
	Arkansas	9	0	1	0	10
	Louisiana	6	0	1	1	8
	New Mexico	4	0	0	0	4
	Oklahoma	5	1	0	0	6
	Texas	21	1	3	1	26
Region 7						
	Iowa	7	0	6	0	13
	Kansas	7	0	1	0	8
	Missouri	12	2	5	0	19
	Nebraska	2	1	2	0	5
Region 8						
	Colorado	12	1	1	1	15
	Montana	8	0	1	0	9
	North Dakota	1	0	0	0	1
	South Dakota	1	0	0	0	1
	Utah	3	2	4	1	10
	Wyoming	1	0	0	0	1
Region 9						
	American Samoa	0	0	0	0	0
	Arizona	6	0	3	0	9
	California	40	8	15	0	63
	Commonwealth of Marianas	0	0	0	0	0
	Guam	1	0	0	0	1
	Hawaii	0	0	6	0	6
	Nevada	0	0	0	0	0
	Trust Territories	0	0	0	0	0
Region 10						
	Alaska	0	0	0	0	0
	Idaho	4	0	0	0	4
	Oregon	4	1	1	0	6
	Washington	20	3	2	3	28
Total		770	32	133	16	951

Exhibit 2.3-4
Historical National Priorities List Sites

Fiscal Year	Annual Number of Sites	Cumulative Total
1987	99	802*
1986	170	703
1985	3	541
1984	132	538
1983	406	406

*This total reflects all sites deleted from the NPL.

The feasibility study (FS) (often conducted concurrently with the RI) is conducted to analyze alternative approaches that can be used to clean up a site. Treatment technologies and non-treatment technologies that meet overall cleanup objectives also are identified. The alternatives analyzed in the FS are developed by screening the universe of potentially applicable technologies and process options. By using readily available information on contaminant types and concentrations and site conditions from the RI site characterization, technologies and process options that clearly are not appropriate are screened out.

Each alternative in the FS is evaluated with respect to the following nine criteria. These criteria fall into three groups: threshold criteria that every remedy must meet (1-2); primary balancing criteria that are used to weigh tradeoffs among remedies (3-7); and modifying criteria that are considered after public comment has been formally received (8-9).

(1) Overall protection of human health and the environment;

(2) Compliance with applicable or relevant and appropriate requirements;

(3) Long-term effectiveness and permanence;

(4) Reduction of toxicity, mobility, or volume;

(5) Short-term effectiveness;

(6) Feasibility;

(7) Cost;

(8) State acceptance; and

(9) Community acceptance.

The results of this analysis provide the rationale for selecting a final remedy that provides the best balance among the inevitable evaluation criteria trade-offs.

Treatability studies determine the relative effectiveness of treatment technologies that are identified as possibilities for the site. The results of treatability studies also are used as bases for developing new technologies and helping EPA meet the new statutory preference in CERCLA for remedies that use treatment to reduce the volume, toxicity, or mobility of hazardous substances at a site or operable unit within a site.

CERCLA section 104(a)(1) allows PRPs to conduct an RI/FSs, provided the RI/FSs meet EPA's standards. The lead agency oversees the process to ensure that the RI/FS is adequate for identifying an appropriate remedy and that it will meet all relevant requirements. In the event of a PRP-conducted RI/FS, the Agency develops an oversight plan that includes a schedule for oversight activities. Generally, activities include reviewing project plans and work products, overseeing the conduct of field activities, and meeting with PkPs.

Progress in Fiscal Year 1987

The SARA amendments to CERCLA include a number of provisions affecting the selection of remedies at Superfund sites. EPA sent to the Regions late in December 1986 and in July 1987 interim guidance on developing and selecting remedies that comply with CERCLA provisions. EPA also sent to Regional personnel in July 1987 interim guidance on compliance with applicable or relevant and appropriate requirements. These interim guidance documents will be superseded by final guidance documents that are scheduled for distribution to the Regions in FY88.

The Agency took a number of actions in FY87 to improve the efficiency of the RI/FS process and to incorporate changes to the RI/FS process in compliance with CERCLA requirements. The following two major project management support activities were initiated in FY87:

- The Alternative Remedial Contracts Strategy (ARCS); and
- The RI/FS improvements initiative.

Key components of ARCS include promoting continuity of performance from RI/FS to construction management, increasing the level of competition for contract awards, developing incentives to promote superior performance, and facilitating the delegation of contract management to the Regions. The ARCS concept was fully developed and procurement actions were initiated in two EPA Regions. More details on the ARCS program are provided in Chapter 6 of this Report.

An RI/FS improvements strategy was forwarded to Regional personnel in July 1987. The strategy includes several initiatives aimed at improving performance on RI/FS projects and proposes implementation strategies for improving project performance, while concurrently streamlining the RI/FS schedule. The strategy is intended to be integrated with concepts from the Data Quality Objectives guidance, the Compendium of Field Standard Operation Procedures, and the guides for remedial project managers (RPMs).

The initiative attempts to provide a realistic strategy for implementing a phased RI/FS that would facilitate compliance with statutory objectives without requiring major changes to the remedial program. This RI/FS improvements effort has three main objectives: to limit project planning activities to a 3-month period following project initiation, with the ultimate goal of reducing the overall RI/FS process to an 18-month schedule; to reduce overall costs; and to improve the technical quality of RI/FSs.

Just after the close of FY87, EPA issued interim guidance that set forth its policy and procedures for PRP participation in RI/FS preparation. EPA plans to issue guidance that will identify the procedures to be followed by RPMs and PRPs to properly initiate, control, and monitor PRP conducted RI/FSs.

In FY87, the Agency achieved its targeted goal for RI/FS starts. A total of 183 RI/FSs were started: 127 Fund-financed RI/FSs and 56 PRP-financed RI/FSs. Exhibit 2.3-5 shows that 76 of the Fund-financed RI/FSs were first starts; the remaining 51 were subsequent starts. Forty-seven of the PRP-financed RI/FSs in FY87 were first starts and nine were subsequent starts. Exhibit 2.3-6 shows the annual number of RI/FS starts from FY80 through FY87. At the end of FY86, over 600 RI/FSs had been started. Under CERCLA section 116 goals, an additional 275 RI/FSs are to begin by October 1989.

Section 301(h)(1)(A) requires that summaries of each FS conducted during a fiscal year be submitted to Congress annually. EPA treats records of decision (RODs) as essentially equivalent to FS summaries. The FS summaries for this Report, therefore, are based on RODs signed during FY87 and include information on the major contaminants of concern at a site, the remedial alternatives

Exhibit 2.3-5

Fiscal 1987 Accomplishments for Remedial Investigation/Feasibility Study Starts and Records of Decision

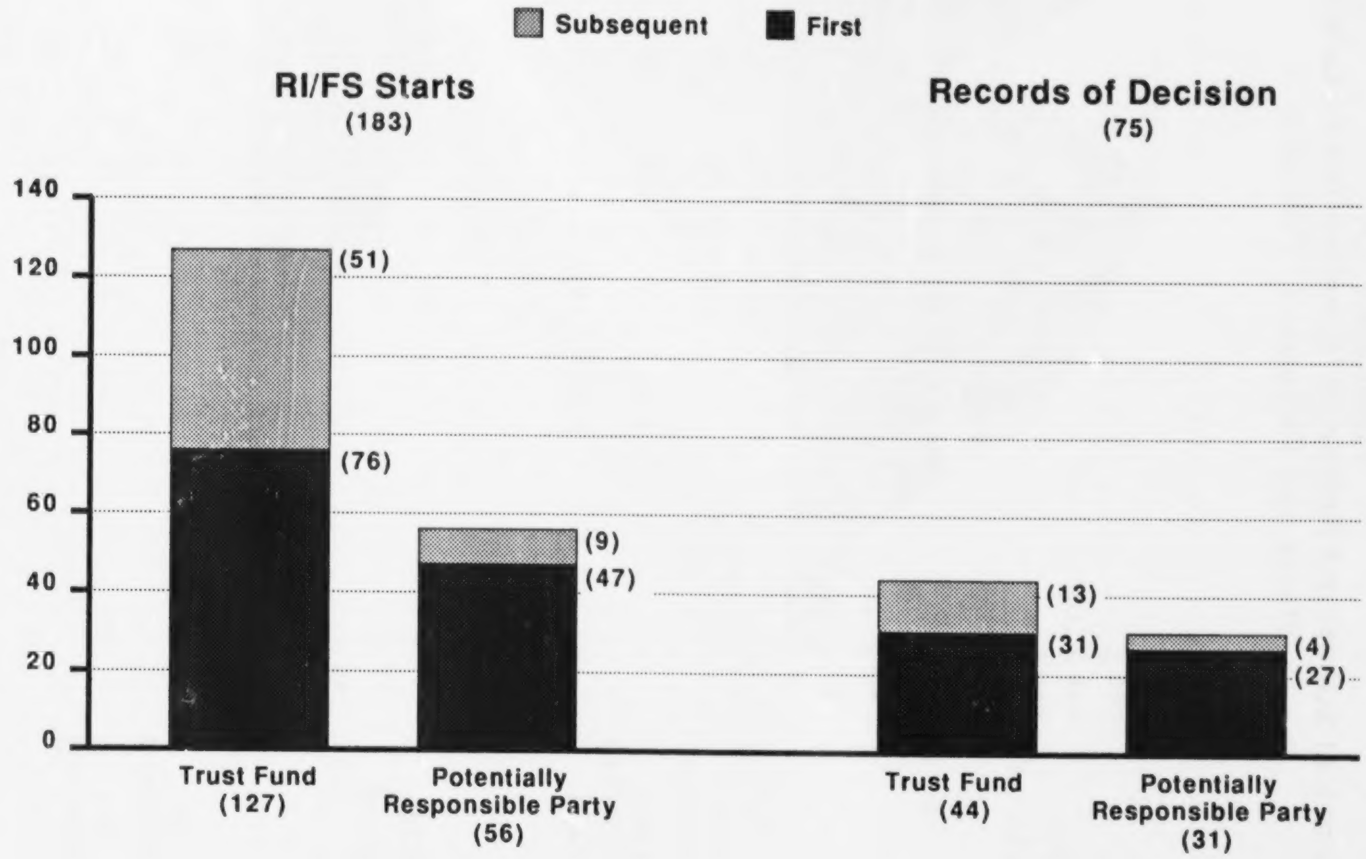
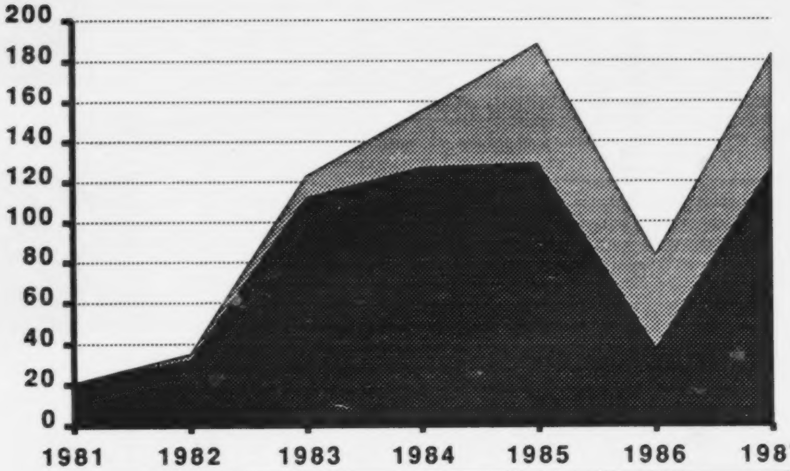


Exhibit 2.3-6

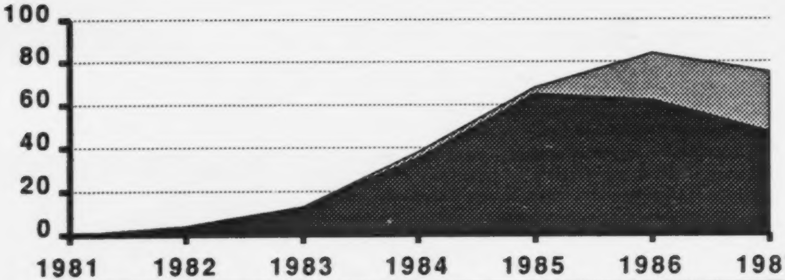
Historical Superfund Remedial Investigation/Feasibility Study Starts and Records of Decision

RI/FS Starts



	1981	1982	1983	1984	1985	1986	1987	Total
▨ PRP* Financed	0	3	11	28	59	46	56	203
■ Fund Financed	21	32	112	127	129	37	127	585
Total	21	35	123	155	188	83	183	788

RODs Signed



	1981	1982	1983	1984	1985	1986	1987	Total
▨ PRP* Financed	0	0	0	3	3	22	31	59
■ Fund Financed	0	4	13	35	65	62	44	223
Total	0	4	13	38	68	84	75	282

*PRP = potentially responsible party.

Note: Only NPL-listed, non-Federal sites are included.
RI/FS starts include both first and subsequent action starts.

considered, and the selected remedy. Appendix C contains the FS summaries for FY87.

2.3.8 Record of Decision/Selection of Remedy

The decisionmaking process that culminates in the selection of the remedy for a site is a multi-step process. The alternatives analyzed in the FS are developed by screening the universe of potentially applicable technologies and process options. By using readily available information on contaminant types and concentrations and site conditions from the RI site characterization, technologies and process options that clearly are not appropriate are screened out. Each remaining alternative is evaluated with respect to nine criteria developed to address the statutory requirements and goals. Based on this evaluation, the Regional Administrator or Assistant Administrator, in consultation with relevant State personnel, selects the remedy for a site.

After a remedy is selected, a ROD is prepared. The ROD is a decision document that identifies the selected remedy from a range of possible remedies identified in the FS. The centerpiece of the administrative record, the ROD is the document by which a court may judge the soundness of the Agency's decisions about appropriate remedial action for a site.

Because the ROD has an important legal and technical role, it must contain an accurate and complete summary of the site. The ROD, therefore, includes an assessment of the threat posed by the site, a description of the remedy, a clear justification for the remedy selected for a site, and a description of the relative advantages and disadvantages of each alternative considered. The ROD also contains a brief description of how the selected remedy satisfies the statutory requirements of CERCLA section 121. The selected remedy must:

- Be protective of human health and the environment;
- Attain applicable or relevant and appropriate requirements (ARARs) (or provide grounds for invoking a waiver);
- Be cost-effective;
- Use permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and
- Address whether the preference for treatment that reduces toxicity, mobility, or volume as a principal element is satisfied, or provide an explanation as to why it is not satisfied.

Progress in Fiscal Year 1987

In June and July 1987, EPA sponsored three ROD workshops around the country to advise RPMs on how to prepare FY87 RODs to ensure compliance with CERCLA. The interim guidance on remedy selection issued in July also included information on new components of the ROD required by CERCLA. This interim guidance explains the nine key criteria to be considered in evaluating and comparing remedial alternatives and the statutory findings about the selected remedy that must be included in the RODs.

The Agency also began to revise the ROD guidance in FY87 to incorporate provisions added to CERCLA by SARA and six years of program experience. The draft guidance, now in progress, includes procedures to follow in developing the proposed plan, a new document for promoting public participation required by CERCLA section 117, and also presents new procedural processes designed to increase State involvement in remedial decisionmaking. Finally, the guidance discusses formats for presenting information in the ROD and procedures for the ROD development process.

Summary of Fiscal Year 1987 Selected Remedies

The 75 RODs signed in FY87 represent approximately 90 percent of the goal for the fiscal year; 58 were for first-start actions and 17 were for subsequent starts (Exhibit 2.3-5). Exhibit 2.3-6 shows the annual number of RODs signed, both for Fund-financed and potentially responsible-party-financed remedial action through FY87.

Remedies selected in RODs can be divided into three categories: (1) source-control remedies that use treatment as a principal component (e.g., incineration, stabilization, solidification, chemical fixation, and biodegradation); (2) source-control remedies that use containment as a principal component (e.g., on-site or off-site landfill disposal and soil capping); and (3) non-source control remedies (including no-action remedies, or those that address only ground water or provide alternative water supplies).

To address the various types and sources of contamination at a site, the ROD often involves more than one remedial component. Treatment-based source-control remedies also may use containment technologies. For example, the ash from an incinerator may be disposed of in an off-site landfill. In addition, remedies classified in the containment-based and treatment-based source-control categories also may have ground-water components. For example, a landfill remedy may have a ground-water component for pumping and treating an aquifer.

The 75 RODs signed in FY87 involve a total of 119 remedial components that are summarized in Exhibit 2.3-7. Thirty-two of these remedial components will employ at least one type of treatment that will permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants at a site: 13 will employ thermal destruction; 7 solidification; 2 stabilization; 3 aeration; 2 soil washing and flushing; 1 biodegradation; and 4 will employ other treatments.

Thirty-five remedies involve containment components to address non-residual waste. On-site containment is involved in 24 remedies; off-site containment in three; and temporary storage in eight. Ground-water pump and treatment actions are included in 32 of the selected remedies. Finally, thirteen remedies provide for alternative water supplies, and seven recommend no further action.

Exhibit 2.3-7

Summary of Remedy Selection in Records of Decision Signed During Fiscal 1987

Remedy	Fund-Lead	Enforcement	Total
Source Control--Treatment Techniques:			
Incineration/Thermal Destruction	10	3	13
Solidification	5	2	7
Stabilization/Neutralization	0	2	2
Volatilization/Aeration	2	1	3
Soil Washing/Flushing	2	0	2
Biodegradation/Land Application	0	1	1
Other	3	1	4
Total	22	10	32
Source Control--Containment:			
On-site Containment	8	16	24
Temporary Storage	8	0	8
Off-site Disposal	1	2	3
Total	17	18	35
Non-Source-Control:			
Ground-water Treatment	18	14	32
Alternative Water Supply	9	4	13
No Further Action	4	3	7
Total	31	21	52

Source: ROD Annual Summary.

A completed RI/FS sometimes results in a ROD recommendation that "no further action" is required to protect human health and the environment for one or more operable units, even though the HRS score for the site indicated a site response was warranted. There may be several possible reasons for such an outcome. The HRS, as a general screening tool, uses a limited data set, while an RI/FS collects and generates much more data to more completely characterize the threat. Alternatively, a previous removal action at the site, or the completion of a previous operable unit, may reduce the threat so that further response action is unwarranted.

CERCLA section 121 requires that permanent solutions and alternative treatment technologies be used at Superfund sites to the maximum extent practicable. In addition, SARA added a statutory preference for remedies that use treatment as a principal element to reduce the toxicity, mobility, or volume of contaminants. The use of treatment-based source control remedies has been increasing steadily over the history of the Superfund program. Exhibit 2.3-8 illustrates historical data on the use of treatment- and containment-based remedies.

2.3.9 Remedial Design/Remedial Action

The selected remedy for a site is refined and specified in the remedial design (RD) phase of the process. Once designed, the project is let for bids and the selected contractor implements the project. At Fund-financed sites, EPA funds 90 percent of the costs of constructing the selected remedy, including on-site or off-site treatment to restore ground-water or surface-water quality for up to ten years. At sites where the State or a political subdivision was responsible for operation of the facility, EPA's contribution to the cost of construction may be 50 percent or less.

Progress in Fiscal Year 1987

As of October 1986, 77 Fund-financed remedial design projects and 54 Fund-financed remedial actions had been started. An additional 39 remedial design projects and 27 remedial actions were started by PRPs over the same period. In FY87, another 70 Fund-financed remedial design projects and 35 remedial actions were started. Exhibit 2.3-9 shows that 57 of the Fund-financed remedial designs and 25 of the remedial actions were first starts. Potentially responsible parties started 24 remedial design projects and 19 remedial actions in FY87. Nineteen of the PRP-financed remedial design projects and 16 of the PRP-financed remedial actions were first starts. Sixty-eight administrative orders for remedial action also were issued. Exhibit 2.3-10 shows the annual number of Fund-financed and PRP-financed remedial design projects and remedial actions (RAs) started from FY80 through FY87.

EPA also laid the groundwork for future increases in the design and construction program. In this effort, Design and Construction Management Workshops were held for Regional and State personnel. Revisions to contracting procedures (such as the ARCS system discussed in Chapter 5 of this Report) were made to improve design and construction program efficiency. EPA also worked with the U.S. Army Corps of Engineers and the Department of the Interior, Bureau of

Exhibit 2.3-8

Historical Data On Remedies Selected in Records of Decision

Fiscal Year	Treatment-Based Source Control Remedies	Containment-Based Source Control Remedies	Non-Source-Control Remedies*
1987	33%	25%	41%
1986	32%	39%	29%
1985	18%	61%	21%
1982-84	11%	57%	32%

*These remedies include providing alternative water supplies, conducting only ground-water treatment, using institutional controls, and also no further action decisions.

Reclamation to establish programs with those agencies that will better meet the needs of expanding Superfund construction program goals.

2.3.10 Operation and Maintenance

As of October 1987, a total of 12 sites had entered the operation and maintenance (O&M) phase. Five of these sites entered the O&M phase in FY87. O&M commences at a site after construction of the remedial action is completed. O&M activities may include collection and treatment of ground water or leachate, maintenance of water monitoring units, and overall site upkeep. For Fund-financed actions, the Fund pays up to 90 percent of the costs of such activities for the first year after an action is implemented to ensure that the remedy is operational. The State pays the remaining 10 percent. At sites where a State or political subdivision was responsible for operation of the facility, EPA's contribution to the cost of operation and maintenance may be 50 percent or less. After the first year, however, all O&M costs are paid by States.

2.3.11 Deletion of Facilities

The Agency has established procedures for deleting from the National Priorities List those sites where conditions no longer threaten human health and the environment. After remedial work is completed at the site, a site may be deleted following public comment, review by EPA Regional and Headquarters staff,

Exhibit 2.3-9

Fiscal 1987 Accomplishments for Remedial Design and Remedial Action Starts

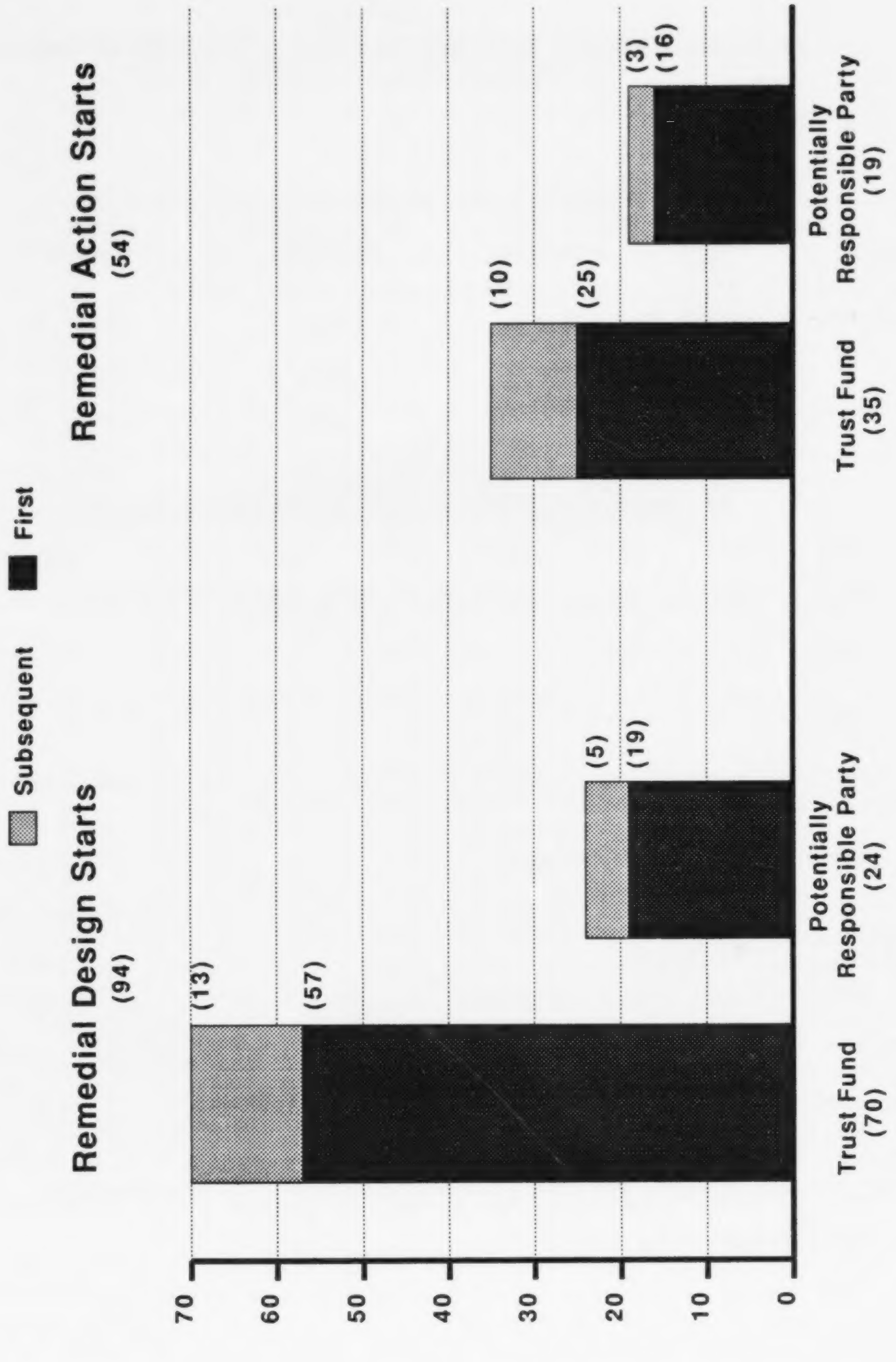
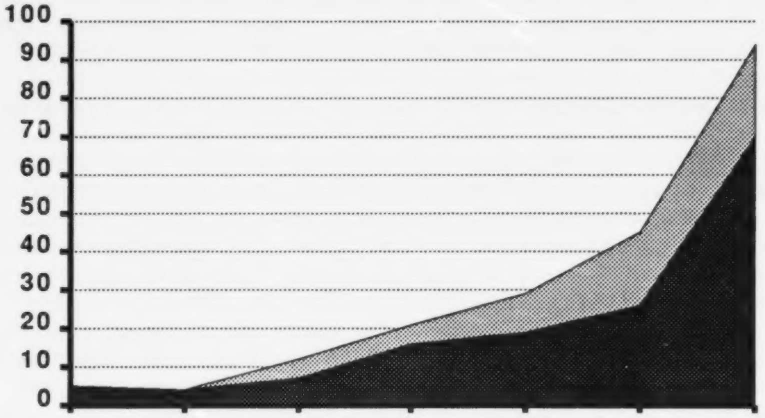


Exhibit 2.3-10

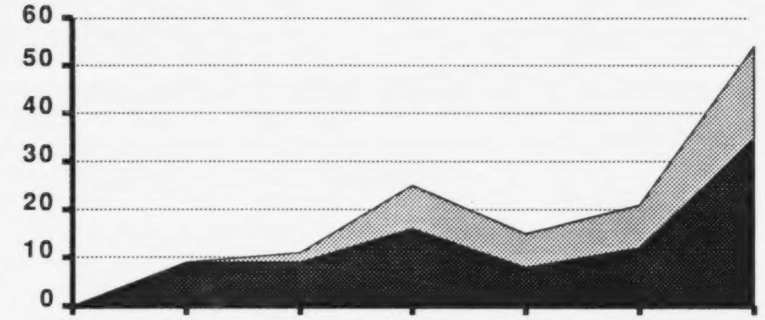
Historical Superfund Program Remedial Design and Remedial Action Starts

Remedial Design Starts



	1981	1982	1983	1984	1985	1986	1987	Total
▨ PRP* Financed	0	0	5	5	10	19	24	63
■ Fund Financed	5	4	7	16	19	26	70	147
Total	5	4	12	21	29	45	94	210

Remedial Action Starts



	1981	1982	1983	1984	1985	1986	1987	Total
▨ PRP* Financed	0	0	2	9	7	9	19	46
■ Fund Financed	0	9	9	16	8	12	35	89
Total	0	9	11	25	15	21	54	135

*PRP = potentially responsible party.

Source: SCAP/Remedial Project Pipeline - National Summary Report (1/25/88).

Note: Data are for actions at NPL sites, including first and subsequent starts. Fund-financed activities include program and Fund enforcement actions. Non-NPL and Federal facilities activities are not included.

and State concurrence. EPA then publishes the deletion decision in the *Federal Register*. Sites deleted from the NPL remain eligible for Fund-financed remedial action should conditions at the site warrant such action.

A notice of intent to delete three sites was published in the *Federal Register* in September 1987. As of the end of FY87, a total of thirteen sites had been deleted from the NPL, eight in FY86 and five in FY82.

2.3.12 State Assurance of Capacity

Section 104(c)(9) of CERCLA requires that a State assure the Agency that it has sufficient capacity for hazardous waste treatment or disposal for a period of 20 years following the date on which EPA and the State enter a contract or cooperative agreement. For Fund-financed remedial actions, assurances must be made by October 1989 or Superfund response action funding may be withheld. In FY87, EPA awarded a grant for $1,200,000 to the National Governors' Association to develop State-recommended guidance on this issue by November 1988. The Association's recommendations are expected to serve as the basis for EPA's final guidance on State capacity assurance.

2.3.13 Additional Enforcement Activities

The enforcement program accomplishments discussed thus far in this chapter are complemented by significant additional work finalized since the passage of SARA and other ongoing efforts.

2.3.13.1 Negotiated Settlements

A fundamental goal of the enforcement program is to negotiate voluntary settlements on cleanup responsibilities as early as possible. EPA, in FY87, negotiated a significant number of settlements related to cleanup activities: RI/FS settlements worth $48,000,000 and RD and RA settlements worth $112,000,000. Also, since the passage of SARA, EPA has continued to develop a number of new mechanisms to facilitate and expedite the settlement process. These include special notice letters, nonbinding allocations of responsibility (NBARs), mixed funding settlements, *de minimis* settlements, covenants not to sue, and arbitration. Each of these mechanisms is discussed in turn below.

Progress in Fiscal Year 1987

In February 1987, EPA issued interim guidance on streamlining the settlement decision process. The Agency has also issued guidelines for expediting the settlement process. The guidance describes modifications that will strengthen and streamline settlement decisionmaking efforts in the following areas:

- **Negotiation Preparation**. EPA will strengthen its negotiating position with a more comprehensive preparation period. The Agency will undertake detailed PRP searches earlier in the remedial process, conduct more complete exchanges of information, initiate discussions with PRPs at an earlier date, and prepare a negotiation strategy and a draft settlement document.

- **Management Review of Settlement Decisions**. EPA established teams to conduct negotiations and raise issues to the Regional Administrators and, where necessary, to the Settlement Decision Committee (SDC). The SDC consists of the Director of the Office of Waste Programs Enforcement (Chairman), Associate Enforcement Counsel-Waste, Chief of the Environmental Enforcement Section at the Department of Justice, and two Regional representatives. While EPA develops guidance material and gains experience with this approach, the SDC will review and oversee certain settlement issues. Regional Administrators will eventually assume broad authority for negotiation decisions.
- **Deadline Management**. EPA recognizes that circumstances arise requiring extension of negotiations beyond the 30-day moratorium. Guidance discourages negotiation extensions, but Regional Administrators may grant extensions of up to 30 days when they believe settlement is imminent. Further extension of RD/RA negotiation beyond the 30-day period may be approved only by EPA Headquarters.

Notice Procedures

CERCLA promotes negotiations between EPA and private parties through the use of notice letters. Notice letters inform PRPs of their potential liability, initiate a continuing exchange of information, and provide an opportunity for PRPs to enter into negotiations to conduct or finance response activities.

In the fourth quarter of FY 1987, 42 special notice letters were issued (31 RI/FS and 11 RA). On October 19, 1987, the Office of Waste Programs Enforcement issued "Interim Guidance on Notice Letters, Negotiations, and Information Exchange" (OSWER Directive Number 9834.10).

The notice procedure is a three-step process. General notice is issued to PRPs early in the process of addressing a site, preferably when a site is proposed for inclusion on the NPL. It informs PRPs of their potential liability for future response costs, promotes information exchange, and initiates the process of "informal" negotiations.

At its discretion, EPA may initiate the second step of the notice process by issuing the RI/FS special notice. The RI/FS special notice is sent to a PRP no later than 90 days prior to the scheduled start of the RI/FS. This procedure, routinely followed by EPA, invokes a moratorium on EPA's RI/FS activities and triggers a period of formal negotiation. The final step of the notice process, the RA special notice, similarly begins a period of negotiation and invokes a moratorium on the Agency's RA activities. For both RI/FS and RA special notices, the moratoria provide private parties with the opportunity to develop and submit a proposal to conduct or finance response activities.

Nonbinding Allocations of Responsibility

As mandated by CERCLA, EPA has developed NBAR guidelines. These interim guidelines were published in the *Federal Register* on May 28, 1987 (52 *FR* 19919). Nonbinding Allocations of Responsibility are notices sent to PRPs under the authority of CERCLA section 122(e)(3) informing them of the percentage of total response costs at a facility that EPA considers to be their responsibility. Major factors considered in determining response cost allocations are the volume, toxicity, and mobility of waste and the nature of the case against the different parties. EPA will issue NBARs (normally during the RI/FS) at its discretion if they are likely to promote settlement. NBARs are not a statement of harm or causation nor are they admissible as evidence. After receiving an NBAR, PRPs may offer to undertake or finance a cleanup; they are expected to determine the final allocation toward settlement among themselves.

Mixed Funding

CERCLA section 122(b) provides explicit authority for mixed funding, which is the use of both private and Fund resources to finance response actions at a single site. Mixed funding results from the need for an expeditious cleanup. EPA's evaluation involves determining both the most effective means of cleanup and the most efficient use of the Agency's resources. The limited contribution of waste by a PRP and financial weakness are two factors that may indicate the appropriateness of mixed funding. Mixed funding is best used in situations involving a small Fund share, and where there exists a strong case against nonsettlors that enables EPA to recover its expenditures from other PRPs.

On March 14, 1988 (53 *FR* 8279), EPA issued guidance that discusses the factors that are considered in determining whether mixed funding is appropriate for a given site. Mixed funding can be accomplished through pre-authorized claims against the Fund and through "cash outs" or "mixed work." EPA has approved three preauthorized PRP settlements for response actions to date: 79 percent of $44,800,000 ($35,000,000), 75 percent of $3,000,000 ($2,250,000), and 66 percent of $10,000,000 ($6,600,000), and several others are under consideration.

De Minimis Settlements

Section 122(g) authorizes EPA to enter into expedited settlements with *de minimis* parties provided that the settlement is in the public interest and involves a minor portion of the response costs at the facility. Two types of *de minimis* parties are defined by this section: *de minimis* contributors (generators and transporters) and *de minimis* landowners. A party may qualify as a *de minimis* contributor when the amounts and toxicity of hazardous substances contributed by that party are minimal in comparison to other hazardous substances at the facility. A *de minimis* landowner is one who did not conduct or permit the generation, transportation, storage, treatment, or disposal of any hazardous substance at the facility. In addition, the landowner must not have contributed to the release or threatened release at the facility.

Parties qualifying for a *de minimis* settlement may be provided with a covenant not to sue. Settlements may be embodied in a consent decree or administrative order. Parties who enter settlements under this provision are entitled to contribution protection.

In FY87, there was one *de minimis* settlement for a value of $340,000 at a site requiring a $2,500,000 remedy and involving $5,500,000 of past costs. The Agency issued guidance on settlements with *de minimis* waste contributors on June 19, 1987. This guidance was published in the *Federal Register* at 52 *FR* 24333 (June 30, 1987). The Agency is presently applying the guidance on *de minimis* contributor settlement at several sites.

Covenants Not To Sue

Section 122(f)(1) authorizes EPA to issue a covenant not to sue to responsible parties for any liability to the United States under CERCLA, including future liability, resulting from a release or a threatened release addressed by a remedial action. Such covenants can be used if: the covenant is in the public interest; it would expedite the response; the settlor is in full compliance with a consent decree under section 106 addressing the release or threatened release; and EPA has approved the response action.

Interim guidance on the use of covenants not to sue, including a model covenant, was issued on July 10, 1987 (52 *FR* 28038, July 27, 1987). This guidance covers the implementation of the mandatory and discretionary provisions of section 122(f) of CERCLA relating to use of covenants. When all necessary conditions are met, EPA may provide a covenant not to sue, but the covenant may not take effect until EPA certifies that the remedial action has been completed.

Arbitration

Section 122(h)(2) of CERCLA, as amended by SARA, authorizes the Administrator, as well as the head of any other department or agency authorized to undertake a response action under CERCLA, to use arbitration as a method of settling section 107 cost recovery claims where the total response costs for the facility concerned do not exceed $500,000, excluding interest. Arbitration may be used in accordance with regulations promulgated by EPA, or other authorized agencies or departments, after consultation with the Attorney General.

EPA has begun to develop a regulation that will establish and govern the procedures by which EPA may use binding arbitration as a method of settling cost recovery claims. The regulation will establish procedures for the referral of claims for arbitration, selection and jurisdiction of the arbitrator, conduct of the pre-hearing conference and arbitral hearing, rendering of the arbitral decision, appeals from and enforcement of the arbitral decision, and fees.

2.3.13.2 Civil and Criminal Litigation

Section 103(a) requires a person in charge of a vessel or facility to notify immediately the NRC as soon as he or she has knowledge of any release, other than a federally permitted release, of a hazardous substance in an amount equal to or greater than a reportable quantity. Criminal sanctions may be imposed for failure to comply. The NRC must convey notification expeditiously to all appropriate agencies, including the Governor of any affected State.

Section 103(b) establishes a notice and reporting requirement for the storage, treatment, or disposal of hazardous substances. The notice must specify the type and amount of hazardous substances found at the facility, and any known, suspected, or likely releases of such substances from the facility. Knowing failure to provide such notice could result in the imposition of criminal sanctions. In addition, the violator will not be entitled to any limitation of liability or to any defenses to liability set out in section 107 of the Act. It is important to note, however, that notice is not required if the facility has already been permitted or accorded interim status under Subtitle C of the Resource Conservation and Recovery Act (RCRA).

Section 103(c) addresses the failure to notify EPA about an unpermitted facility at which a hazardous substance is treated, stored, or disposed. Section 103(d) addresses destruction or concealment of records that the Act requires to be maintained. Criminal sanctions may be imposed for failure to comply with the requirements of these subsections.

SARA amended CERCLA enforcement authority by adding civil penalties and strengthening the existing criminal penalties. SARA added Class I and Class II administrative penalties under section 109 for non-notification concerning the release of a hazardous substance in an amount equal to or greater than its RQ.

Past and Ongoing Criminal Enforcement Activities

Since FY 1983, the EPA's Office of Criminal Investigations, the National Enforcement Investigations Center (NEIC), has conducted 183 investigations that have been based in whole or in part on suspected violations of the criminal provisions of CERCLA. Of these investigations, 136 are closed and 47 remain active. To date, approximately 20 investigations have resulted in prosecutorial action taken pursuant to CERCLA. These include two cases involving convictions and one case involving reversal. An additional four investigations have inspired criminal cases that remain open pending appeal or further prosecution. These 24 cases include counts for violations of section 103(b) and (c) of the Act.

Progress in Fiscal Year 1987

In August 1987, EPA developed interim guidance on imposing Class I and Class II penalties for non-notification concerning releases of hazardous substances in amounts equal to or greater than RQs. These procedures will amend the Consolidated Rules of Practice at 40 CFR Part 22.

2.3.13.3 Enforcement Regulations, Policies, and Guidances

Since the passage of SARA, a number of regulations, policies, and guidances have been issued or are near completion. These documents support both enforcement and settlement efforts.

Administrative Record

CERCLA section 113(k) requires EPA to establish an administrative record for selecting a response action. Regulations allowing interested parties to participate in the development of the administrative record must also be promulgated. Use of the record achieves two goals:

- It allows for increased public participation in the selection of the response action.
- It limits the scope of any judicial review to the available record in any judicial action concerning the adequacy of response action, thereby minimizing delay and reducing the cost of litigation.

The Agency drafted proposed regulations on the administrative record in conjunction with revisions to the NCP. The regulations are subpart I of the proposed revised NCP. In May 1987, the Agency issued guidance on the use of the administrative record in selecting CERCLA response actions. Several training sessions, workshops, and Regional visits have been conducted to ensure adequate compilation and maintenance of the administrative record. To date, most Regions have compiled administrative records for their high-priority sites.

Indemnification of Response Action Contractors

CERCLA section 119 requires that EPA first publish guidance, and then regulations, concerning EPA indemnification of Superfund Response Action Contractors (RACs) working for EPA, States, or potentially responsible parties. Section 119 also requires that EPA guidance be developed and that adequate opportunity for public comment be provided. To assist with guidance development, EPA has organized an internal Task Force, an external review panel consisting of insurance and actuarial experts, and another external review panel consisting of representatives of the RAC community.

The Task Force has distributed interim guidelines and interim indemnification contract language to EPA contracting officers for use with EPA contracts. Interim guidance has also been provided to the Regional Offices concerning indemnification of RACs working for States and PRPs, as well as more detailed guidance concerning indemnification of EPA contractors. Final guidance is currently under development and will be proposed in the *Federal Register* for public comment. Following the public comment period, final guidance will be published.

All EPA response action contracts containing indemnification clauses have been modified to reflect the requirements of section 119. Pursuant to section 119, several RACs working for States at State-lead NPL sites have been offered indemnification by EPA. To date, EPA has not offered indemnification to any RACs working for PRPs.

Supplementary Enforcement Directives

In addition to the key guidances of the enforcement program discussed above, OSWER has issued a number of enforcement-related directives in FY 1987. These directives serve to describe procedures of the enforcement mission and to amplify CERCLA provisions related to enforcement.

Procedures pertaining to the early phase of an enforcement action are laid out in directives that cover access to a site and provide guidelines for the PRP search and off-site response. Other directives describe landowner liability, limitations on cost recovery, and the reimbursement of abatement costs. A final directive pertains to changing the status of a site from enforcement to Fund lead.

2.4 Status of Active Remedial Investigations/Feasibility Studies and Remedial Actions

This section includes a summary status report for all RIs, FSs, and RAs in progress as of September 30, 1987, the end of the fiscal year. The detail of the status report, required by subparagraph (B), (C), and (F) of CERCLA section 301(h)(1), is presented in Appendix D. At the end of FY87, remedial activities were underway at 533 sites. There were 642 ongoing remedial projects: 548 RI/FSs, 15 FSs, and 79 RAs. The reference date used to determine the status of the projects is January 1, 1987, which, EPA acknowledges, may not account for all the time gained or lost in the life cycle of a given project. However, EPA chose the date because it marked the first update for RI/FS and RA projects after the hiatus between Superfund authorizations. Choosing an earlier date would have included time lost due to circumstances beyond EPA's control.

To understand what the status report means, we have included the following discussion of the EPA approach, based on operable units, to accounting for cleanup activities at a Superfund site. At many Superfund sites, a number of remedial activities* may be needed because, in addition to a discrete source of contamination, soil, ground water, air, or surface water also may be contaminated. Remedying this degree of contamination is often a complex task, requiring health and environmental risk assessment and painstaking design of an engineered solution.

Operable Units

To handle complex problems efficiently, the needed site work is often divided into several distinct activities or "operable units" that take form at the start of or during an RI/FS. One operable unit may begin and end at a different point in time from another, depending on a variety of factors. Most operable units are specific to a group of activities intended to mitigate some part of the threat to human health or the environment posed by the site.

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* Investigations and studies done to determine the extent of a release, although included in the statutory definition of removal activities in CERCLA section 101(23) by reference to section 104(b), are commonly considered components of the remedial program and are treated as such in this Report.

The first operable unit is referred to as the first start; operable units that follow are referred to as subsequent starts. The first operable unit may involve replacing a water supply; a second operable unit may control the spread of contamination from an abandoned municipal waste landfill and the associated plume of ground-water contaminants that is flowing toward a public water supply wellfield.

The operable unit approach enables EPA to effectively set priorities for site cleanup and manage the project overall. After the remedy for an operable unit is selected in a ROD, the RD phase usually follows, and then construction of the RA begins. Many events influence the progress of an operable unit through the Superfund system. The more significant influences include:

(1) Changes in the entity primarily responsible for the project, which can be EPA, a State, or a potentially responsible party or parties;

(2) Changes in the number of operable units underway at a site; operable units are sometimes consolidated or expanded due to new information or changes in circumstances; and

(3) Complex contracting arrangements involving EPA, the States, potentially responsible parties, and the availability of response action contractors.

EPA's system for tracking the status of RI/FSs, FSs, and RAs, illustrated in Appendix D, reflects the operable unit approach by including the RI/FSs, FSs, and RAs for each operable unit at a site. Numbers illustrating project status are presented in Exhibit 2.4-1; project totals by Region and State are illustrated in Exhibit 2.4-2.

2.4.1 Status of Remedial Investigations and Feasibility Studies

Of the 563 combined RI/FS and FS projects, 48 (8.5 percent) were ahead of schedule, and 148 (26.3 percent) were on schedule. Approximately 57 percent of RI/FS and FS projects were behind schedule at the end of the fiscal year: 280 (49.7 percent) of the RI/FSs were 1 to 4 quarters behind schedule; 35 (6.2 percent) were 5 to 8 quarters behind; and 8 (1.4 percent) were more than 8 quarters behind. No estimates of completion for the remaining 44 (7.8 percent) had been made prior to the estimates made at the end of the fiscal year. Thus, there is no basis of comparison for these projects.

Project delays can be attributed to many factors including the hiatus in program funding during the FY85-FY86 period; the necessity to complete complex contracting arrangements before projects could begin; and a high level EPA employee turnover. The Agency's goal is to complete an RI/FS and select a remedy within 18 to 21 months. Historically, however, RI/FSs have taken 24 to 35 months to complete.

Exhibit 2.4-1

Status of Remedial Investigation/Feasibility Study and Remedial Action Projects at the End of Fiscal 1987

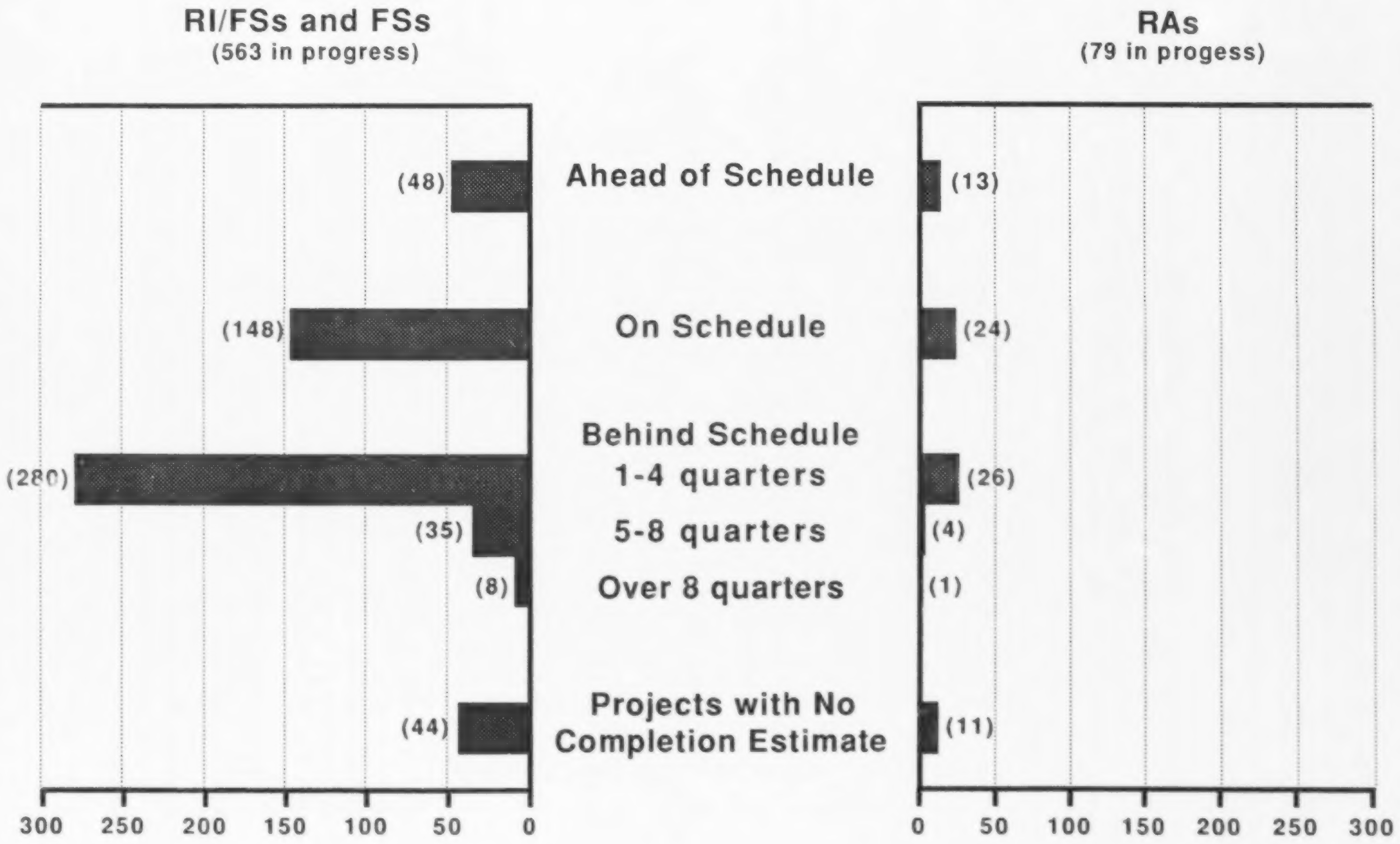

Exhibit 2.4-2

Remedial Investigation/Feasibility Study and Remedial Action Projects in Progress at the End of Fiscal 1987 by Region/State

Region	State	RI/FSs	FSs	RAs	Sites
Region 1	Connecticut	3	0	3	4
	Maine	4	0	1	5
	Massachusetts	19	2	3	15
	New Hampshire	7	0	1	7
	Rhode Island	5	0	1	5
	Vermont	1	0	0	1
	Total	39	2	9	37
Region 2	New Jersey	52	2	3	56
	New York	41	0	12	39
	Puerto Rico	5	0	0	5
	Total	98	2	15	100
Region 3	Delaware	3	0	0	3
	Maryland	4	0	0	4
	Pennsylvania	37	0	8	41
	Virginia	8	1	1	9
	West Virginia	3	0	1	4
	Total	55	1	10	61
Region 4	Alabama	7	0	0	7
	Florida	13	1	1	15
	Georgia	1	0	0	1
	Kentucky	4	0	0	4
	Mississippi	2	0	0	2
	North Carolina	8	0	0	8
	South Carolina	6	0	0	6
	Tennessee	3	0	0	3
	Total	44	1	1	46
Region 5	Illinois	16	0	1	14
	Indiana	15	0	3	17
	Michigan	37	0	5	37
	Minnesota	19	0	7	16
	Ohio	20	0	1	21
	Wisconsin	17	0	1	18
	Total	124	0	18	123

Exhibit 2.4-2
(continued)

Remedial Investigation/Feasibility Study and Remedial Action Projects in Progress at the End of Fiscal 1987 by Region/State

Region	State	RI/FSs	FSs	RAs	Sites
Region 6	Arkansas	5	0	1	6
	Louisiana	2	0	2	4
	New Mexico	7	0	0	4
	Oklahoma	3	0	0	3
	Texas	20	1	3	20
	Total	37	1	6	37
Region 7	Iowa	7	0	2	8
	Kansas	6	0	0	4
	Missouri	13	1	4	11
	Nebraska	6	0	1	4
	Total	32	1	7	27
Region 8	Colorado	9	2	1	8
	Montana	18	1	0	5
	North Dakota	1	0	0	1
	South Dakota	0	1	0	1
	Utah	6	0	0	6
	Wyoming	1	0	0	1
	Total	35	4	1	22
Region 9	Arizona	8	0	0	6
	California	52	3	7	51
	Guam	1	0	0	1
	Total	61	3	7	58
Region 10	Idaho	4	0	0	3
	Oregon	4	0	1	5
	Washington	15	0	4	14
	Total	23	0	5	22
Total All Regions		548	15	79	533

RI/FS Initiatives

The Agency has initiated several activities directed specifically toward acceleration of RI/FS projects. A key step, the RI/FS Improvement Initiative, includes planning, priority-setting, use of operable units, and streamlining of the RI/FS process. RI/FS streamlining focuses on tailoring the scope and detail of the RI/FS to site conditions. The analysis of evaluation criteria and the development of a range of remedial alternatives will be better suited to the complexity of the problems at the site. Fewer alternatives will be developed for sites with straight-forward problems, and clearly impractical alternatives will not be studied in detail.

OERR revised RI/FS guidance to reflect the new emphasis and provisions of CERCLA, incorporate aspects of new or revised guidance related to RI/FSs, incorporate management initiatives designed to streamline the RI/FS process, and take advantage of experience from previous RI/FS projects, where appropriate.

2.4.2 Status of Remedial Actions

Of the 79 ongoing RA projects, 13 (16.5 percent) were ahead of schedule; 24 (30.4 percent) were on schedule. A total of 31 (39.2 percent) RA projects were behind schedule: 26 (32.9 percent) were 1 to 4 quarters behind schedule; 4 (5.1 percent) were 5 to 8 quarters behind; and 1 (1.3 percent) was more than 8 quarters behind. For the remaining 11 (13.9 percent), there were no prior estimates of completion.

RA Initiatives

A key initiative is OSWER's Strategy for Management Oversight of the Remedial Action Start Mandate. Although directed primarily toward satisfying CERCLA's new mandate for RA starts, it also establishes a Headquarters-Regional management plan that incorporates principles that will be applied throughout the program to accelerate the response process. Using current Superfund Comprehensive Accomplishments Plan (SCAP)/Strategic Planning and Management System (SPMS) accountability systems, the Agency will focus attention on early portions of project schedules to identify projects that could slip or issues that could affect project schedules, such as State cost assurances, site access, disposal capacity, or property acquisition. The program will also use the upgraded CERCLIS and the Office of Enforcement and Compliance Monitoring (OECM) docket to track the progress of each project and develop exception reports on projects that are behind schedule. Appropriate assistance can then be provided to keep projects on schedule.

Also, OERR is developing model design schedules based on Agency experience with a variety of remedial alternatives. Model schedules will assist Remedial Project Managers in preparing accurate site-specific schedules and action plans. Another important step was the development of the project management concept under which the program will emphasize the importance of involving only one contractor in all phases of the response. OERR is implementing the single-contractor concept through ARCS, which will award numerous remedial contracts in a Region or group of Regions. ARCS will promote continuity of performance from RI/FS through construction management, increase competition for remedial contract awards, and facilitate the delegation of contract management to the Regions. Regions will be able to pinpoint and assign additional work to contractors doing quality work on schedule.

In addition, OERR is considering a construction management support program that would make a construction management specialist available to assist the Regions in planning and executing RDs and RAs. OERR is also negotiating with the Corps of Engineers and the Bureau of Reclamation about their role in meeting program objectives. Negotiations are focused on working closely with the Regions and establishing faster contracting procedures for assigned RDs and RAs.

2.4.3 Initiatives to Meet Schedules

During FY87, the Agency developed a multiple-initiative strategy to accelerate RI/FS and RA activities and meet schedules for RI/FS and RA initiation and completion. The objectives of the strategy are to improve EPA's ability to estimate the duration of projects, to complete projects on schedule, and to meet the additional responsibilities imposed by amendments to CERCLA that require EPA to begin 175 first-start RA projects by October 16, 1989, and an additional 200 by October 16, 1991.

Enforcement Initiatives

The enforcement program is working to expedite processes such as settlement negotiations that may delay response actions. Negotiations will be tracked to ensure compliance with guidance on streamlining the CERCLA settlement process. Also, special notice guidance has been completed requiring that moratoria imposition coincide with release of the FS and proposed plan in order to minimize delays in remedy implementation after the ROD is signed.

Regional Initiatives

Regional initiatives include the insertion of schedules in all cooperative agreements, interagency agreements, contracts, work assignments, and consent decrees to ensure that EPA will meet scheduled targets. In addition, to avoid slippage in the initiation of remedial construction, the Regions may subject remedial designs to review for bidability, constructability, and operability.

2.5 Status of Facility Reviews Under CERCLA Section 121(c)

Section 301(h)(1)(E) of CERCLA requires a report on the progress made in reducing the number of facilities (or sites) subject to periodic review under section 121(c). In addition to satisfying the section 301(h)(1)(E) requirement, this Report satisfies other and similar requirements in section 121(c) to report to Congress: (1) a list of facilities for which such review is required; (2) the results of all such reviews; and (3) any actions taken as a result of such reviews. The available information on section 301(h)(1)(E) and section 121(c) requirements is included in this Report, and will be augmented in subsequent reports as section 121(c) implementation proceeds.

Section 121(c) of CERCLA requires a 5-year review of those sites at which hazardous substances, pollutants, or contaminants remain at a site after remedial action has been initiated. It is further stipulated that if the results of a review indicate further action is necessary, the appropriate action should be taken. The Agency proposed a policy, in the revisions to the NCP, for defining the sites where reviews must be conducted and describing the purpose of the 5-year reviews. The application of this policy (summarized in section 2.5.1) will be affected by the progress made in implementing remedies that adhere to the cleanup standards specified in section 121.

2.5.1 Facilities Subject to Review

Selected remedial actions permit hazardous substances, pollutants, or contaminants to remain on site when they do not threaten human health or the environment. However, if the concentration of contaminants left on site exceeds established levels, EPA is proposing to conduct a facility review to ensure the remedy continues to be protective of human health and the environment. This approach is consistent with clean closure under the Resource Conservation and Recovery Act. Reviews will be conducted at sites currently considered to have "safe" levels of contaminants if and when standards defining protective levels are changed such that these sites are considered to have "unsafe" levels of contamination.

If a review shows that a remedy is no longer protective, additional actions shall be taken to mitigate the threat. Sites will become subject to the review process and enter the inventory upon completion of the remedial action. Sites deleted from the NPL will still be eligible for review. Facility reviews are not planned to be conducted at non-NPL sites where removal actions have been undertaken.

Once EPA finalizes the policy for implementing section 121(c), operating procedures will be established for:

- Tracking site status, including quantity of wastes remaining on site, occurrence of releases, integrity of containment or other remedial measures, and need for further remediation;

- Re-examining site status, including potential application of newly developed treatment technologies, and procedures to initiate new remedial action; and

- Collecting information on site status and reporting to EPA managers and Congress.

Procedures also will be established for determining the progress made in reducing the number of facilities subject to review under section 121(c). Progress in this area will be a function of increases in selection of source-control remedies that include treatment.

Exhibit 2.5-1

Facilities Subject to CERCLA Section 121(c)*

Region	State	Site Name	Status
2	New Jersey	Friedman Property	Deleted from NPL
3	Maryland	Chemical Metals Industries, Inc.	Deleted from NPL
3	Pennsylvania	Enterprise Avenue	Deleted from NPL
3	Pennsylvania	Lehigh Electric and Engineering Co.	Deleted from NPL
4	Georgia	Luminous Processes, Inc.	Deleted from NPL
4	Mississippi	Walcott Chemical Co. Warehouses	Deleted from NPL
4	North Carolina	PCB Spills	Deleted from NPL
5	Michigan	Gratiot County Golf Course	Deleted from NPL
5	Minnesota	Morris Arsenic Dump	Deleted from NPL
5	Ohio	Chemical and Minerals Reclamation	Deleted from NPL
9	American Samoa	Taputimu Farm	Deleted from NPL
9	Saipan	PCB Warehouse	Deleted from NPL
9	Trust Territory of Pacific Islands	PCB Wastes	Deleted from NPL

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*The final list of sites that are subject to 121(c) review is still being developed. This list currently includes only sites that have been deleted from the NPL and that potentially are subject to section 121(c) review. Other sites potentially subject to review, including sites where operation and maintenance has commenced, are being considered for inclusion.

2.5.2 List of Facilities Subject to Review

Facilities potentially subject to review under section 121(c) are listed in Exhibit 2.5-1. The list now includes sites that have been deleted from the NPL. A review is being conducted to determine at which of these sites remaining contaminants exceed health-based levels. EPA also will review sites at which remedial action or operation and maintenance has started for possible inclusion on the section 121(c) list.

2.6 The Cost Recovery Program Under CERCLA Section 107

During the fiscal year, EPA Regional offices referred 37 cost recovery cases with a combined dollar value of $30,592,354 to EPA Headquarters. A total of $18,866,000 was collected and deposited in the CERCLA Trust Fund. Exhibit 2.6-1 illustrates the key results of the cost recovery program prior to and during FY87, and also includes the number of actions referred to the Department of Justice (DOJ), actions filed by DOJ, and the dollar amounts the actions represent.

Through the end of FY87, EPA had initiated actions to recover $242,000,000 worth of costs incurred at 158 sites and had collected $48,598,000. Exhibit 2.6-2 illustrates the value of cost recovery settlements for each fiscal year. During FY88, EPA expects to initiate 49 additional cost recovery actions worth approximately $118,000,000.

EPA's object in the cost recovery program is to pursue reimbursement in every case where there is a financially viable PRP. The liability imposed on PRPs by CERCLA section 107 enables EPA to begin response action at a site without waiting for the outcome of a legal action. In this way, the program allows response action to go forward and conserves Superfund dollars.

During the pre-remedial investigation, parties identified as being responsible for the threat posed by a site are given the opportunity to design, construct, and fund cleanup action. The PRPs, which may include generators and transporters of the hazardous substances involved in the release as well as current and former owners or operators of the site, must agree to reimburse EPA before the start of the RI/FS.

If PRPs initially refuse to pay for site cleanup, EPA can proceed with the necessary response actions and subsequently sue the PRPs to recovery costs. EPA can also, under CERCLA section 104, recover the costs of third-party oversight activities, which are incurred when EPA contractors assist EPA in the oversight of PRP cleanup activity. For example, EPA contractors may oversee field activities, such as sampling. The Agency can sue PRPs or recover oversight costs by administrative order or consent decree.

Exhibit 2.6-1
Cost Recovery Activities

Civil Actions	FY 1987		Prior to FY 1987		Totals	
	Actions	Value	Actions	Value	Actions	Value
Referred to EPA HQ from the Regions	37	$30,592,354	--	--	37	$30,592,354
Referred to DOJ	24	$7,000,000	153	$247,000,000	177	$254,000,000
Filed by the Federal Government	27	$43,000,000	121	$161,000,000	148	$204,000,000
Settled by the Federal Government	50	$19,000,000	49	$26,000,000	99	$45,000,000
Settled without filing an action	12	$1,000,000	56	$5,000,000	68	$6,000,000
Trust Fund Reimbursement		$18,866,000		$29,732,000		$48,598,000

Values listed for settlements include accounts receivable, not just amounts collected.

Exhibit 2.6-2

Value of Cost Recovery Settlements by Fiscal Year

Fiscal Year	Total Dollars Recovered
1987	$35,755,000
1986	17,300,000
1985	18,000,000
1984	7,000,000
1983	2,000,000
1982	3,000,000
1981	250,000
Total	$83,305,000

3.0 THE FEDERAL-STATE PARTNERSHIP IN IMPLEMENTING CERCLA

3.1 Overview

The original CERCLA enacted in 1980 provided for State involvement in response activities by allowing EPA to enter into cooperative agreements (CAs) with States to undertake Fund-financed response activities. CERCLA, as amended, extended this opportunity to Indian Tribes and political subdivisions and included enforcement in the definition of response.

EPA may enter into CAs with States or political subdivisions of States, or Indian Tribes which: (1) allow a State to take the lead in response activities at a single site or at several sites in the State; (2) allow EPA and the State to take the lead for different response activities at a site or number of sites in the State; and (3) provide funding for States to assist or support EPA-lead response actions. In addition, EPA uses Superfund State contracts to gain assurances regarding shares of response costs for which States are responsible, and State operation and maintenance obligations at EPA-lead sites.

The Agency has developed guidance for entering into CAs with States that enable the States to take the lead on Fund-financed pre-remedial response (PAs and SIs), remedial response (RI/FSs, RDs and RAs), removals, and enforcement activities. EPA has also developed guidance for CAs with political subdivisions. CERCLA provides for Indian involvement in the Act's implementation by requiring that Indian Tribes be treated substantially the same as States, and by authorizing EPA to enter into CAs with Indian Tribes in order that they may take the lead for CERCLA response.

Federal agreements with States to conduct remedial actions also have been affected by CERCLA section 104(c)(9). Beginning in 1989, a State must assure EPA that adequate capacity exists for the destruction, treatment, or secure dispostion of all hazardous waste expected to be generated within the State. The assurance must be made for the 20-year period following the signing of a CA with a State; EPA provides this assurance for agreements involving Indian Tribes.

SARA emphasizes the CERCLA provisions concerning State involvement by requiring "substantial and meaningful" State involvement in all phases of response activities. Specifically, the passage of SARA required the Agency to undertake several initiatives, including promulgation of procedures for State involvement under CERCLA section 121(f), and the identification of applicable or relevant and appropriate requirements (ARARs) in the Federal-State partnership.

Finally, CERCLA requires that EPA develop and implement procedures to adequately notify concerned State and local officials of limitations on the payment of claims for CERCLA response costs.

3.2 Progress in Fiscal Year 1987

EPA's FY87 achievements in the area of State participation in Superfund consisted of the planning and implementation of CERCLA-mandated measures, and the enhancement of these measures by several additional EPA initiatives.

3.2.1 Oversight Policy

Increased State involvement in hazardous substances response will require, in some instances, changes in EPA's oversight role and more flexibility in Agency oversight of State implementation of CERCLA and State-lead activities. The Agency is developing a comprehensive oversight policy for State implementation of CERCLA and detailed guidance on how to apply this policy. The policy will address the following components: (1) working with States to reduce or eliminate duplication of Federal and State efforts; (2) identifying weaknesses and strengths in State efforts; (3) assisting States in improving their capabilities; (4) helping States increase their participation in Superfund responses; (5) improving State environmental programs to focus efforts on tangible cleanup results, rather than on financial and accounting work; and (6) ensuring that the oversight effort corresponds to a State's capability, experience, and role in the particular response activity.

3.2.2 Superfund Memorandum of Agreement

EPA also encourages State involvement beyond the minimum statutory and regulatory requirements through a Superfund Memorandum of Agreement (SMOA). The SMOA is an agreement between the EPA Regional Administrator and the head of the relevant State agency that defines the State's role and EPA's role when each one acts as the lead or support agency at a hazardous waste site.

The SMOA spells out processes for Federal-State coordination on pre-remedial, remedial, and enforcement response activities, and on certain aspects of removal activities. The SMOA clarifies roles and expectations, thereby improving coordination and reducing misunderstandings. The SMOA provides the opportunity for all States, as their individual capabilities permit, to become more active and undertake greater responsibility in response activities. The SMOA establishes an annual consultation process in which EPA and the State agency identify the lead agency for various response activities, set priorities, and provide for State involvement in long-range planning. Individual CAs or multi-site CAs combine with the SMOA to make the Federal-State partnership as flexible as possible.

3.2.3 State Involvement Regulations

Section 121(f) of CERCLA, which was added by SARA, requires that the Agency promulgate regulations providing States with an opportunity for "substantial and meaningful" participation in all aspects of remedial response. CERCLA also establishes minimum statutory requirements for State involvement.

The Agency has developed proposed revisions to the NCP that include CERCLA-mandated regulations on State participation in the implementation of the Act. Under this proposal, Subpart F of the proposed revised NCP addresses all issues related to State involvement in hazardous substance response. Subpart F delineates State involvement in pre-remedial, remedial, and enforcement response in the manner required by CERCLA section 121(f)(1). The proposed NCP also defines EPA involvement as a support agency in State-lead response activities. The proposed revisions to the NCP were published in November 1988.

The Agency provided for significant State participation in the development of the proposed revisions to the NCP through a State Issues Reauthorization Workgroup and through State involvement in the NCP Workgroup and other Superfund Implementation Workgroups. To facilitate State participation in these Workgroups, EPA provided a grant to the National Governors' Association (NGA) in 1987 to work closely with the State representatives on the workgroups, and also with the Association of State and Territorial Solid Waste Management Officials (ASTSWMO), and the National Association of Attorneys General (NAAG) to assure that all State views were received.

As part of this process, the NGA staff liaison has: (1) coordinated the various State concerns and conveyed these concerns to EPA; (2) provided information on workgroup efforts to ASTSWMO and NAAG for distribution to their members; (3) ensured that State representatives received materials and advance notice of workgroup meetings; (4) coordinated the selection of State representatives to serve on newly formed Superfund workgroups; and (5) served as a State liaison between the EPA project officer, workgroup chairs, and other appropriate EPA staff and the States. EPA has provided NGA with a second grant to continue this work through FY88 and FY89.

CERCLA, as amended, requires EPA to attain State ARARs that are promulgated and are more stringent than Federal ARARs. Subpart F of the proposed revisions to the NCP requires Federal-State interaction on identification of ARARs and will establish an appropriate process. In addition, the Agency is developing procedural guidance for implementing this requirement that will outline the procedures and roles of States and EPA when acting as lead or support agency.

The Agency is also developing specific guidance on Federal-State relationship in identifying ARARs to determine how to address "more stringent" State standards, particularly under Federal environmental statutes where States either have delegation or are otherwise authorized to administer the Federal programs. In addition, the Agency is developing guidance on how the Agency will address unique State requirements, such as bans on landfill disposal, siting requirements, or non-degradation standards.

The Agency includes requirements for State credits toward State cost-share obligations in the revised NCP. The Agency has prepared interim guidance on State credits and is improving Agency financial management systems to ensure proper management and application of State credits.

The Agency is also providing for State involvement in the selection of remedy process that will depend upon a State's capability and experience, the EPA-State relationship, and site-specific characteristics. The Agency is developing comprehensive guidance on the State remedy selection process for State-lead sites, including the timing and procedures associated with the process, and criteria to determine State eligibility to participate in the process.

CERCLA and the State involvement regulations that are part of the proposed changes to the NCP significantly expand State involvement in the remedial process. In addition to those elements discussed above, the remedial process includes an annual planning meeting at which the EPA Region and the State identify the lead agency for a site-specific response, establish priorities and schedules, and agree on funding requirements. The remedial process requires lead agency consultation with the "support" agency prior to publication of the proposed plan and the inclusion of a statement in the notice of the proposed plan detailing the support agency's position on the plan.

3.2.4 Training

The Agency increased its technical assistance and training efforts during the year. A training course for Cooperative Agreement Project Officers at EPA and at State agencies was developed. The Agency also developed a construction management course for the EPA Regional offices and the States. The Agency will continue to work with States and State officials' associations to provide technical assistance to States on how to establish a program to implement CERCLA and how to develop and enhance State capabilities to participate more fully in CERCLA implementation.

3.2.5 Notice of Limitations on the Payment of Response Claims

Section 111(o) of CERCLA, as amended by SARA, provides that the President shall develop and implement procedures to adequately notify concerned local and State officials and other concerned persons of limitations on the payment of claims for necessary response costs. The statute requires that the procedures be developed no later than 90 days after enactment of the CERCLA amendments. The notice procedures, once developed, would be utilized as soon as practicable after a site is included on the NPL.

EPA was delegated the responsibility for implementing notice procedures under CERCLA section 111(o) by January 17, 1987. Due to time constraints, and the link with the procedures for filing claims against the Trust Fund under section 112, EPA notified the public that section 111(o) and section 112 procedures would be proposed jointly.

On February 5, 1987, EPA published in the *Federal Register* a notice titled "Limitations on Superfund Response Claims" (52 *FR* 3699) to advise the public of the limitations on CERCLA response claims and that adequate opportunity for comment would be provided before EPA adopted procedures for notice pursuant to section 111(o) of CERCLA. EPA's *Federal Register* notice referred the public to the NCP, at section 300.25(d), that requires that any person who takes a response action and intends to seek reimbursement from the Fund must (1) notify EPA and (2) obtain EPA's approval prior to undertaking the response action. EPA's process of prior approval is known as "preauthorization."

EPA plans to propose procedures to notify persons of the limitations on response claims (i.e., section 111(o) procedures) and the procedures for filing claims against the Fund (i.e., section 112 procedures) in 1989. These procedures, to be proposed as 40 CFR Part 307, will also serve to advise the public of the requirements to be complied with in order to obtain preauthorization.

3.2.6 Other Initiatives

A key stumbling block to increased State participation in CERCLA implementation has been the lack of State capability. Thus, EPA is establishing a core funding cooperative agreement. This non-site-specific funding vehicle will support State functions necessary to implement CERCLA and build State capability. Examples of eligible funding categories are general program management, training, interagency coordination, general legal assistance, and fiscal and contract management. Three CAs for core programs were funded in FY87.

In order to involve States in the initiation and development of guidance on the remedial process, the Agency will continue the State Issues Workgroup, which will provide a forum for State issues and concerns.

The Agency is now developing detailed guidance on how the State capacity assurance will be made, when, and under what circumstances, it will be required, and what States must do to provide EPA with an adequate assurance. The Agency is also providing technical assistance and funding to States to generate the data necessary to make this assurance (see section 2.3.12 of this Report).

Finally, the Agency is developing guidance for entering into CAs with federally recognized Indian Tribes and working with the Bureau of Indian Affairs and the Indian Health Service on how the operation and maintenance assurance can be provided and how EPA will involve Indians in the response process. The Agency develop implementing guidance that will address Indian involvement in hazardous substances response, just as it now does for States. In addition, the revised NCP includes Indian participation provisions.

4.0 PUBLIC INFORMATION AND COMMUNITY RELATIONS

4.1 Public Information

EPA has developed several resources that members of the public can use to obtain information about the program in general, to get an answer to a question about a particular Superfund site, or to get an update on regulatory development activities. In addition, EPA has established an Ombudsman to resolve complaints about Superfund actions.

4.1.1 Superfund Hotline

The Superfund Hotline (1-800-424-9346; 382-3000 in D.C.) is EPA's public information service for Superfund-related questions. During calendar year 1987, the Hotline received a total of 19,376 inquiries: 16,346 requests for information and 3,030 document requests. The number of inquiries has increased steadily each year.

The Hotline provides help with interpreting CERCLA, as amended by SARA, and SARA provisions and related regulations, and answers a wide range of questions on the Superfund program. If an inquiry cannot be answered by the Hotline, the information specialist will refer the issue to the appropriate office (e.g., Office of General Counsel) and will report the information back to the caller. Document requests are also handled by the Hotline; orders are taken for publications or the caller is referred to the correct source.

In addition to responding to questions about EPA activities, the Hotline can refer callers to the correct State or Regional coordinator. Questions about Title III (Emergency Planning and Community Right-to-Know) were not handled by this service during FY87.

4.1.2 Superfund Docket and Information Center

The Superfund Docket and Information Center (SDIC) is the public document records center for rulemaking actions and regulatory decisions under CERCLA as amended by SARA, and was established shortly after enactment of Superfund in 1980. Rulemakings and records of proceedings under the Emergency Planning and Community Right-to-Know Act of 1986 (SARA Title III) are also included. Also included are CERCLA guidance documents and directives, Records of Decision, and information supporting rulemaking under section 3012 of the Resource Conservation and Recovery Act (RCRA). The docket supports EPA staff and management, while also serving the public right of access.

The rulemaking dockets contain background data, public comments on regulatory actions, *Federal Register* notices, transcripts of public hearings, support documents for regulatory decisions, correspondence/memoranda, and Administrative Records. The docket also prepares responses to requests under the Freedom of Information Act (FOIA). Rulemaking records which have had prior Office of General Counsel (OGC) approval are available to the public for viewing. Copies of operating directives and RODs and signed decision documents are also available.

The public is allowed access to docket materials upon announcement of the rulemaking in the *Federal Register*. No access is granted prior to the announcement because (1) the *Federal Register* notice needs to be included in the docket index as part of the Agency's rulemaking rationale, and without it the index would be incomplete, and (2) visitors would have an unfair advantage over the general public who rely on the *Federal Register* for notice of rulemaking. The SDIC responds to all manner of inquiries; specific requests by the public to view files are by appointment.

The SDIC is located in Room M-2427 in EPA Headquarters, at 401 M Street, S.W., Washington, D.C. 20460. The main telephone number for the SDIC is (202) 382-3046 (docket appointments) and (202) 382-6940 (Superfund documents/ROD information). SDIC hours of operation are Monday through Friday from 9:00 a.m. to 4:00 p.m. The SDIC is closed on Federal holidays.

4.1.3 Public Information Center

The EPA's Public Information Center (PIC) distributes a wide variety of general, non-technical information to the public (202/382-2080). EPA publications on all major environmental topics, including Superfund, are available through the PIC.

When the public expresses an interest in a topic on which there are no publications, the center informs the appropriate EPA Program Office about the public interest in the topic, so that the office can develop appropriate publications or fact sheets. In addition to distributing informational materials, the center refers requests to the appropriate source. The PIC maintains a limited on-site inventory of publications, and will order other publications from its Cincinnati warehouse.

4.1.4 Hazardous Waste Ombudsman

EPA has established an Office of Ombudsman at Headquarters (202/475-9361) and in each Regional office. In FY87, the Ombudsman program handled over 2,000 questions and complaints. An ombudsman is an impartial public official who investigates questions and complaints about government officials or administrative actions and seeks to correct problems where warranted. The term ombudsman originated in Sweden, where an ombudsman was first appointed in 1809.

EPA's Ombudsman program is intended to assist citizens and members of the regulated community who have been unable to voice a complaint or get their problems solved through normal channels. The program is not intended to circumvent existing channels of management authority or established administrative and formal avenues of appeal.

4.2 Community Relations

In addition to the general information activities described above, EPA promotes two-way communication between the communities affected by specific releases of hazardous substances and the lead government agencies responding to those releases through its Superfund community relations program. The program ensures that the local public is provided with accurate and timely information about the progress of response plans. This information enables the local public to comment on and help make decisions about response actions. A thorough, well-planned community relations effort is an integral part of every Superfund response.

Even before the CERCLA was enacted in 1980, EPA began development of a community relations program that would be able to respond to the variety of interests and information needs of diverse site communities across the country.

4.2.1 Public Participation Under CERCLA Section 117

Beginning with enactment of SARA, EPA implemented requirements necessary to comply with CERCLA section 117 public participation provisions and expects to complete implementation in FY88. The revised NCP will include additional regulations on community relations that reflect CERCLA requirements and the experience EPA has gained over the past seven years. Currently, EPA is developing guidance on community relations for the settlement process, the litigation process, and for Federal facility sites subject to CERCLA section 120. All guidance and training programs, including the handbook *Community Relations in Superfund*, will be updated to comply with the new CERCLA requirements. An interim version of this manual was completed in October 1987. New community relations fact sheets are also being developed.

Section 117 of CERCLA, which was added by SARA, provides for public involvement in the decisions made concerning cleanup actions at Superfund sites. Section 117 requires that the public be informed of proposed remedial action plans; be given an opportunity to comment on these proposals; be informed of final plans, including EPA responses to public comments on the proposals; and be informed of any actions taken that differ from the final plans, as well as the reasons for the changes.

Naturally, the efforts made by EPA's community relations program are assisting in the implementation of the section 117 requirements. Of particular importance is EPA's long-standing effort to incorporate components of the Superfund community relations program into Superfund technical activities. This past year, community relations skills training was completed for more than 500 hazardous waste officials in 14 States as well as technical enforcement and community relations personnel in the 10 EPA Regional offices. Community relations training has been incorporated as a module in all of the major technical training programs, from the CERCLA orientation training to the Record of Decision Workshops for EPA staff.

As EPA Superfund policy and guidance documents are developed and updated, discussions of community relations issues and activities are incorporated so that EPA and State technical, enforcement, and community relations staff are equally knowledgeable and encouraged to work as a team. The Agency continues to provide support as well as initiate innovative community relations activities. This year, EPA produced fact sheets for public distribution and completed a pilot project on dispute resolution for three EPA Regions.

4.2.2 Technical Assistance Grants Under CERCLA Section 117(e)

In 1987, EPA requested comments from the public on its proposed regulations implementing the technical assistance grants (TAG) program. The TAG program is designed to provide funds to communities for the purpose of their hiring advisors to interpret technical information related to cleanup of Superfund sites listed on the NPL. This assistance will provide affected communities with a better understanding of the nature of the site problems and alternative solutions, thus allowing them to participate more effectively in the decisions made concerning Superfund sites. The TAG program can provide grants of up to $50,000 per site. Only one grant may be issued for each site, and the community is required to contribute 35 percent of the amount required to obtain the necessary technical assistance.

The comments received on the proposed TAG regulations were considered in formulating interim TAG regulations, which were published on March 24, 1988 (53 *FR* 9736). The interim regulations enabled the Agency to begin accepting applications and awarding grants, while it continues to receive additional comments that will be considered in developing the final TAG regulations.

4.2.3 Public Participation in Development of Administrative Records Under CERCLA Section 113(k)

On May 29, 1987, EPA issued a directive to its Regional offices that details initial implementation steps to meet the section 113(k) requirement for administrative records for the selection of response actions at Superfund sites. Under section 113(k), EPA must provide for the participation of interested persons in the development of the administrative record for both removal and remedial actions. The directive instructs the Regional offices to establish administrative records (if not already established) at each Superfund site. In addition, the directive details contractor support and assistance available to the Regional offices and outlines documents that must be included in administrative records. The directive was designed to assure that administrative records would be established and in place in time for FY87 ROD signatures, and to ensure consistency in the administrative records for different sites.

5.0 PROGRAM AND IMPLEMENTATION SUPPORT

EPA undertook a number of program and implementation support initiatives to facilitate the implementation of CERCLA, train workers in health and safety, and expedite Superfund program progress. A major accomplishment was the creation of a sophisticated management information system, which was achieved by consolidating and improving previous administrative support systems. EPA also assessed its training, technology transfer, and information dissemination needs and began implementing a program-wide strategy that resulted in more than 200 presentations of 50 different courses to more than 11,000 attendees, as well as the publication of a number of training documents. Finally, EPA diversified its contracting program and delegated increased contract management responsibility to the Regions in order to better meet the needs of the removal and remedial programs and to expedite completion of response actions.

5.1 Administrative System Support

Access to the information contained in the following seven data bases is essential for maintaining EPA's ongoing capacity to implement Superfund activities.

5.1.1 Modification of CERCLIS

The first generation CERCLIS contained pre-remedial data on approximately 27,000 sites, including their identity and location, cost of cleanup, descriptive data, and Region-specific data. During the year, EPA implemented a second generation CERCLIS by incorporating into the existing system part of the information and data contained in the following four systems:

- The *Superfund Comprehensive Accomplishments Plan* provides data on all response activities.

- The *Removal Tracking System* provides a comprehensive removal data base that includes start date, location, lead agency, and NPL status.

- The *Case Management System* contains general information on all enforcement activities, with information on cost recovery and settlements.

- The *Remedial/Removal Financial System Site File* tracks the actual obligations for operable units for each facility (or site) and event (e.g., a RI/FS start) for site activities conducted under IAGs, CAs, or contracts with States, Indian Tribes, political subdivisions, or other Federal agencies.

This expanded CERCLIS is the national reporting, tracking, and management tool of Superfund. The pilot test of the national data base was completed by Region 9 in August 1987. CERCLIS, second generation, became operational at the end of October 1987.

5.1.2 Superfund Comprehensive Accomplishments Plan

The Superfund Comprehensive Accomplishments Plan establishes annual activity and financial targets for the accomplishment of response actions. Each year, EPA Headquarters works closely with the Regional offices to determine program targets. These targets are tracked against program accomplishments throughout the year.

In FY87, EPA improved SCAP's usefulness as a planning and management tool. First, EPA incorporated SCAP into second generation CERCLIS and, consequently, the Regions became responsible for the planning and reporting that determine the adequacy of budgetary allotments and how Regional accomplishments are reported. Second, EPA began using SCAP to track enforcement activities as well as remedial and removal activities. This integrated approach to SCAP development was implemented in the following ways:

- Target setting and reporting for Fund-financed activities and enforcement/PRP activities were combined;
- Uniform reporting formats combining removal, remedial, and enforcement information were developed;
- The enforcement case budget was integrated with the SCAP; and
- Regions began planning the use of Technical Enforcement Support contract and interagency agreement resources on a site-specific basis, the basis on which remedial activities are planned.

5.1.3 Strategic Planning and Management System/Action Tracking System

The objective of the Strategic Planning and Management System (SPMS) is to develop a strong system of integrated planning, guidance, and oversight that includes the States in EPA's planning and program implementation. The EPA Administrator establishes long-term strategies and a priority list. SPMS provides a framework and system for accomplishing the objectives laid out by the Administrator.

The Action Tracking System (ATS) is one component of SPMS. It follows the regulatory development of major regulations, guidance, and policies across the Agency for all programs. The ATS provides the Deputy Administrator with reports pinpointing potential problems as regulations and guidance are developed.

In September 1987, CERCLA and SARA were incorporated into ATS. OSWER will be required to track supplemental guidance and regulations listed in the "Agency Operating Guidance." OSWER must also track any CERCLA or SARA regulations published bi-annually in the *Federal Register*'s "Unified Agenda."

5.1.4 Superfund Enforcement Tracking System

This data base, operated and maintained by the Office of Waste Programs Enforcement (OWPE), contains the names and addresses of PRPs. In FY87, the data base was expanded to include the NPL status of each site, the date a notice letter was sent to all PRPs, and the contact person for each site.

5.1.5 Case Budget System

The Case Budget System tracks enforcement program work assignment activity and funds for the Technical Enforcement Support contracts. This system was expanded to include fund requests, actual fund allocations, and work assignment numbers. As a result, contracts are now more easily and accurately tracked.

5.1.6 Cost Documentation Monitoring System

This data base contains the requirements to support cost documentation for section 107 case referrals, and the data on documented costs. In FY87, information on statutes of limitations for section 107 cases began to be tracked.

5.1.7 OSWER Directives System

The OSWER Directives System provides a systematic process for identifying and communicating policy and procedures to the Regions. This Directive System establishes a document numbering system designed to track and manage all current program policy and guidance related to implementation in the Regions and States. Additionally, the System permits ease in identification of approval level of directive documents, provides a central Regional location for all directives, and maintains a comprehensive index of valid directives.

EPA considers only directives that originate in or are issued by one of the OSWER offices, Regional offices, or other EPA offices, and that affect at least one of the Regional Waste Divisions or Environmental Services Divisions appropriate for inclusion in the system. Also, documents issued by the Administrator or Deputy Administrator that are not included in the Agency Directives System will be included in the OSWER Directives System. Each directive is numbered to identify the originating office. Superfund Directives are numbered from 9200 through 9399 and 9800 through 9899.

In FY87, EPA offices issued approximately 40 Superfund-related directives and policies. The following major directives were issued:

- CERCLA Compliance with Applicable or Relevant and Appropriate Requirements Guidance;
- Selection of Remedy Guidance;
- Hazard Ranking System Revisions;
- Technical Assistance Grants;
- Nonbinding Allocation of Responsibility Guidance; and

- *De Minimis* Settlement Guidance.

5.2 Training Programs

OSWER is responsible, under CERCLA section 311(b), for the coordination of training in the areas of solid and hazardous waste and emergency response. Activities related to these responsibilities include long-range planning, analysis, and evaluation; the identification of training requirements; training development, delivery, and coordination within and among program offices; and management and training support to EPA Headquarters, Regions, and States as requested. The overall approach to training being implemented by OSWER is one that will focus training on improving job performance, providing a consistent format for training development and delivery, and maximizing the effectiveness of training resources through the use of innovative training methods.

The recently established Office of Program Management and Technology (OPMT) within the Office of Solid Waste and Emergency Response serves as a focal point for coordinating research and development, technology transfer, and training. In conjunction with the Office of Research and Development (ORD), this office has specific responsibility for the development and implementation of long-term training and technology transfer strategies for OSWER. Technological innovations developed through research and demonstration programs (such as the SITE program described in section 7.2 of this Report) are incorporated into technology transfer activities and training to ensure that advances in knowledge and skills are made available to Superfund staff.

5.2.1 Training Programs in Fiscal Year 1987

OSWER provided a large number of training courses, seminars, and workshops related to critical training needs as well as in other areas such as health and safety. Approximately 50 different courses were offered during the fiscal year. In all, more than 200 sessions were attended by approximately 11,000 individuals. This represents a substantial increase over the 6,000 to 8,000 persons trained in FY86. EPA and State and local agency staff were equally represented, accounting for approximately 80 percent of trainees, with the remaining 20 percent distributed among other Federal agencies, contractors, and industry. Training courses were offered in EPA Headquarters, EPA Regions, and at Environmental Response Branch Training Centers in Cincinnati, Ohio, and Edison, New Jersey.

OSWER's FY87 extramural budget for Superfund training activities included training funded by EPA Headquarters, continuing training in safety and Superfund operations operated by OERR's Emergency Response Division, and additional funds expended by the Regional offices. OSWER awarded more than $43,000,000 in training contracts.

5.2.2 Meeting Critical OSWER Training Needs

OSWER completed a training needs assessment in March 1986 that identified several areas in which it considers training a high-priority need: ground-water monitoring, CERCLA regulations, risk, remedial engineering, cleanup technologies, community relations, compliance monitoring, contingency planning, and on-scene coordination. To meet these training needs, EPA developed the following tools:

- A draft Ground Water Curriculum and Implementation Plan that identified ten critical training needs in this area. Efforts are underway to develop the required training.

- A National SARA Videoconference that was viewed by over 5,000 persons in March 1987 and was followed by a series of regional SARA Implementation Meetings in six major cities. In addition, the CERCLA orientation course was revised to reflect the new CERCLA provisions.

- A Risk Assessment course focusing on the Superfund Public Health Evaluation Process that was delivered in all ten EPA Regional offices during FY87.

- A training module entitled Hazardous Waste Cleanup Technologies and Their Application at Superfund Sites that was piloted in early FY87 and covered the existing state-of-the-art in hazardous waste engineering methods. A seminar on innovative and emerging cleanup and engineering technologies was also presented in concert with ORD's Hazardous Waste Engineering Research Laboratory as a part of OSWER's technology transfer series.

- A Superfund Community Relations Training Strategy that included proposed courses for implementation in FY88.

- A focused task analysis for Superfund Enforcement Compliance Monitoring that concentrated on the functional areas of ground water and incineration.

- The National Response Team (NRT) Training Strategy, in coordination with other NRT agencies, to address training in the areas of contingency planning and hazardous materials response. The strategy addresses several issues related to interagency coordination, needs assessment, task analysis and identification of training target audiences, and it suggests implementation activities in each area.

- A draft On-Scene Coordinator/Remedial Program Manager Training Curriculum to provide Superfund on-scene coordinators (OSCs) and remedial program managers (RPMs) with task-related training critical to fulfilling Agency objectives. The curriculum delineates required, optional, and specialized courses for Superfund employees.

5.2.3 OSWER Training Documents

In an effort to implement a comprehensive OSWER training and technology transfer program and execute the responsibilities of the new Office of Program

Management and Technology, OSWER has developed several training documents. Among the most significant of these are the following:

- The *Technology Transfer Strategy* was developed in April 1987 to assist OSWER in disseminating innovative and emerging environmental research activities at the leading edge of technology.
- The *OSWER Training Implementation Plan* presents a management plan to address the major recommendations contained in the OSWER Training Strategy.
- The *OSWER Training Policies and Procedures* document is intended to be used by Headquarters and the Regions as a guide to the conduct of training activities. The document addresses the areas of curriculum planning and revision, needs definition, training priorities, course development and delivery activities, and training evaluation and program management. Volumes I and II of the policy document were issued as OSWER Directive No. 9018.00-2, September 30, 1987.

5.2.4 Organizational Improvements

OSWER has made significant progress in implementing organizational improvements related to greater coordination and increased management commitment to training and technology. A brief description of several major program accomplishments follows.

Superfund Work Force Planning Project

Early in the fiscal year, OSWER created a task force made up of representatives of the Office of Human Resource Management (OHRM), OSWER, and several of the Regional offices to implement the recommendations contained in the Superfund Work Force Planning Study. Efforts to implement the recommendations of the study and the subsequent *GAO Report to Congress on Superfund Improvements Needed in Work Force Management*, dated October 1987, are underway. A plan is currently being developed and is scheduled for implementation in FY89.

Technology Transfer

The *Technology Transfer Strategy*, issued jointly by OSWER and ORD in April 1987, outlines a systematic approach for disseminating information. The strategy focuses on creating an organizational framework within which the Agency can better define problems in the field, develop and disseminate technical products, and evaluate the effects of those products. Proven techniques are then transferred to Regional, State, local and private sector users through training and other methods.

National Response Team Training Committee

The NRT Training Committee is responsible for coordinating training in contingency planning and hazardous materials response among the member agencies of the NRT. In FY87, the NRT Training Committee:

- Supported a Hazardous Materials training conference in an effort to establish Federal, State, and local relationships;
- Developed a concept paper on how best to establish focal points for coordinating State and local hazardous materials training;
- Coordinated meetings and conducted briefings for national trade organizations to increase private industry participation in a coordinated hazardous materials training system;
- Provided support for the development of a videoconference on public health impacts of hazardous materials incidents; and
- Conducted a focused task analysis for local response teams, hazardous materials teams, and medical teams to ensure that training is related to job requirements in this area.

Training for Other Federal Agencies

As part of its coordination with other Federal agencies in hazardous substance response, OSWER provided specialized training in EPA's hazardous waste programs and policy to both the National Park Service and the Indian Health Service. As a part of the Department of the Interior training program for Park Service Safety Officers, the Technology Staff of OPMT developed and delivered specialized training that emphasized the handling of hazardous materials and the responsibilities of Federal facilities under Superfund. For the Indian Health Service of the Department of Health and Human Services, a course providing an overview of the Superfund program and EPA's Indian Policy was developed. The training also reviewed the legislative background of jurisdictional issues involving hazardous waste releases on Indian land.

5.2.5 Future of Training Programs

OSWER has developed a structured and organized training program to meet Superfund program needs, and has developed plans and policies to provide focused and coordinated training, improved training capacity, and a stronger commitment to training. Future training funds budgeted for Superfund will be used to implement innovative training methods to increase the effective use of training resources. OSWER will build upon the accomplishments outlined above to implement the ideas that have been developed in both the training and technology transfer areas. The Superfund program will develop the technology assistance concept, and OSWER will work toward developing the means to expand opportunities for the participation of small and minority business enterprises in training and technology transfer.

5.3 Contracting Support and Programs

5.3.1 Overview

EPA used contracts in five categories to implement the Superfund program: (1) Headquarters/Regional policy and program implementation; (2) removal action; (3) remedial action; (4) enforcement support; and (5) contract laboratory services. In FY87, the Superfund program administered 153 active contracts, with a potential value of $2,363,355,000:

- Six contracts, with a potential value of $63,000,000, support Headquarters and Regional programs for policy development and implementation. Under these contracts, contractors provide both technical and non-technical assistance.
- One hundred thirteen contract laboratory contracts, with a potential value of $288,000,000, supported the Contract Laboratory Program (CLP) to provide laboratory services for both removal and remedial actions. The greatest number of Superfund contracts fall into this category.
- Seventeen contracts, with a potential value of $946,255,000, supported the removal program. Removal program contracts provide EPA with support in emergency response, other removal actions, spill prevention, and analytical services.
- Nine remedial action contracts provide EPA with technical assistance during RI/FS, remedial design, and construction stages. These contracts have a potential value of $925,600,000.
- Eight enforcement contracts assist EPA in cost recovery and litigation support operations. Combined they have a potential value of $140,500,000; seven of the eight were awarded in FY87.

Of these 153 active contracts, a total of 136 were awarded during the year, with a potential value of $1,503,855,000. Exhibit 5.3-1 lists FY87 contract awards and their potential value.

Two significant contract initiatives are represented among the contracts awarded in FY87: the Alternative Remedial Contract Strategy (ARCS) and the Environmental Services Assistance Teams (ESAT) contracts. ARCS contracts perform the same functions as, and will replace, remedial planning (REM) contracts. They are, however, awarded on a Regional basis rather than on an east-west zone basis. The ESAT contracts will provide laboratory services, as requested, to all areas of the Superfund program.

Exhibit 5.3-1

Fiscal 1987 Contract Awards

Contract	Number of Contracts	Length of Contracts	Total Potential Value
General Policy and Technical Support	4	Up to 5 years	$43,000,000
Response Support:			
Laboratory	110	Up to 4 years	$221,000,000
Removal	16	Up to 5 years	$903,755,000
Remedial	5	Up to 5 years	$325,600,000
Enforcement Support	1	Up to 4 years	$10,500,000
Total	136		$1,503,855,000

5.3.2 Response Support Contracts

Laboratory Support Contracts

During the fiscal year, EPA awarded 110 new contracts to provide sample analysis services under the Contract Laboratory Program. These contracts have a potential value of $221,000,000. The CLP provides laboratory service for all removal, pre-remedial, and remedial actions, and is responsible for analyzing samples taken at various stages of the cleanup process. EPA awards contracts for organic, inorganic, and dioxin analytical services. These contracts are awarded continually, depending on capacity needs.

In FY87, the CLP ran a total of 91,524 Superfund site samples. Most CLP analysis is done for site samples taken during RI/FSs. Exhibit 5.3-2 shows the annual number of RI/FS site samples analyzed by the CLP since the inception of the Superfund program.

Organic and inorganic samples, because of different contractual requirements, have different result turnaround times. The median processing time for an organic sample is 32 days and for an inorganic sample it is 31 days. Sample results are returned to the Region for review, the length of which varies from several days to several months. With few exceptions, turnaround times on average have been maintained below the contract-allowed 40 days. Data

Exhibit 5.3-2

Site Samples Analyzed For Remedial Investigations/Feasibility Studies by Fiscal Year

Fiscal Year	Samples Analyzed
1980	1,500
1981	5,000
1982	16,000
1983	43,000
1984	52,000
1985	71,000
1986	71,000
1987	80,000

compliance with the quality assurance/quality control requirements is above the 90 percent level for the first time.

EPA's latest awards in support of the laboratory program are two ESAT contracts worth $35,000,000 each. These two contracts, both awarded at the end of FY87, provide assistance to EPA's Regional offices in laboratory, analytical, and review services. The contracts cover different geographical zones (the eastern zone includes Regions 1, 2, 3, 4, and the western zone includes Regions 5, 6, 7, 8, 9, 10, and HQ). Their periods of performance can extend to 4 years depending on the number of options exercised.

Removal Support Contracts

The removal program traditionally has been supported by Emergency Response Cleanup Services (ERCS) contracts. The ERCS contracts were recompeted this year and awards range in potential value from $60,000,000 to $165,000,000 over a 4-year period of performance. ERCS contractors operate on a zone basis, with several EPA Regions included within each of four zones:

Zone I: Regions 1, 2, and 3;
Zone II: Region 4;
Zone III: Region 5; and
Zone IV: Regions 6, 7, 8, 9, and 10.

Also, EPA developed and began implementation of a strategy for awarding smaller removal contracts, "mini-ERCS," on a Regional basis. EPA also plans to provide additional support to the Regions in FY88 by dividing one of the ERCS zones into two smaller zones and awarding a contract for each of them.

Four contracts were awarded to support the dioxin removals being conducted at Castlewood and other related sites in the St. Louis, Missouri area. These contracts have a total potential value of approximately $75,452,000, over a 4-year period. EPA also awarded a contract with a potential value of $703,000 to conduct a site-specific removal at the American Steel Drum site in Bedford, Ohio in EPA Region 5.

EPA awarded two Technical Assistance Team (TAT) contracts in December 1986 to replace the previous sole TAT contract. The combined potential value of both contracts over a 5-year period of performance is $219,0000,000. Each contract covers a different portion of the country. The eastern zone contract supports Regions 1-5, the Emergency Response Team, and EPA Headquarters. The western zone contract supports Regions 6-10. The TAT contracts serve as adjuncts to the ERCS contracts and provide for initial site response support, determinations of the size and nature of the site, and support for On-Scene Coordinators during actual cleanup.

This year, the Environmental Emergency Response Unit (EERU) contract was divided into three separate contracts, a Response Engineers and Analytical contract, an Environmental Response Training contract, and an EERU contract. These contracts provide emergency response support to hazardous waste sites or spills posing an immediate threat. These first two contracts were awarded in FY87. The Training and Response Engineers contracts will run for 5 years and provide up to $138,000,000 in support, primarily to provide engineering response for the Environmental Response Team's field activities.

One ERCS contract was awarded to an 8(a) (minority) firm. This contractor will also be allowed to perform small remedial operations. The contract has a potential value of $12,253,000 and extends from October 1987 through September 1988. Two Regional ERCS were awarded, both of which are also 8(a) contracts.

Remedial Support Contracts

EPA developed and commenced implementation of the ARCS, a substantial change in its remedial contracting program. The ARCS concept is aimed at maximizing competition in the remedial program, providing additional incentive for improved performance, and promoting project continuity. There will be numerous smaller remedial response contracts awarded continuously in each Region or, in some cases, in several Regions combined. Each Region will award six to ten contracts.

Work will be assigned to these contracts based on quality of performance and the program will emphasize keeping the same contractor involved in all phases of the cleanup process. The first awards were made in EPA Regions 3 and 5 in January 1988; coverage in all Regions is planned by the end of FY89. Contracts will range from $60,000,000 to $250,000,000 in potential value over

10-year periods. As in the current remedial contracts, the ARCS will contain large subcontracting pools to maximize the number of contractors participating.

Two Field Investigation Team (FIT) contracts were awarded in FY87 to provide support for pre-remedial activities; each has a 5-year period of performance and will expire in November 1991. One of these contracts has a potential value of $130,000,000 and provides support for Regions 1-4 in the eastern half of the country. The other contract has a potential value of $150,000,000 and supports Regions 5-10 in the western half of the country.

Minority business firms were awarded two smaller contracts to perform remedial response activities. They have a potential value of $21,500,000 each, and have 4-year periods of performance. EPA also awarded a single contract with a potential value of $2,600,000 designed specifically to procure support for remedial response activities at the Wausau, Wisconsin site through 1991.

Enforcement Support Contracts

EPA awarded one contract, with a potential value of $10,500,000, to provide litigation services for cost recovery, support PRP searches, and fund oversight for PRP and Federal facility cleanups under both CERCLA and RCRA.

5.4 Superfund Resource Utilization

This section presents data and information on the utilization of resources from the Hazardous Substance Trust Fund (Superfund) for implementation activities by EPA and other Executive branch departments and agencies in FY 1987. The data and information included in this section were obtained primarily from EPA Superfund budget documents. Superfund resource requirements of EPA and other Executive branch departments and agencies for FY 1988-1991 and beyond FY 1991 are discussed in Chapter 13.

EPA uses Superfund resources in four major areas:

- Hazardous Substance Response;
- Enforcement;
- Management and Support; and
- Research and Development.

Both EPA Headquarters and the Regional offices perform these Superfund activities. Fiscal year and historical transfers to Regional offices are shown in Exhibits 5.4-1 and 5.4-2. In addition, EPA transfers resources to other Federal departments and agencies to assist them in meeting their responsibilities under CERCLA. The Agency also transfers funds from the Superfund appropriation to State governments and other private sector organizations (e.g., the National Governors' Association) to assist EPA in the implementation of CERCLA.

In FY 1987, the Agency utilized a total of $1,050,748,900 from the Hazardous Substance Superfund appropriation for CERCLA implementation, including SARA Title III activities. Superfund implementation activities that EPA conducted under the four major program areas accounted for $984,600,900. The

Exhibit 5.4-1

Fiscal 1987 Superfund Program Resources To Regional Offices

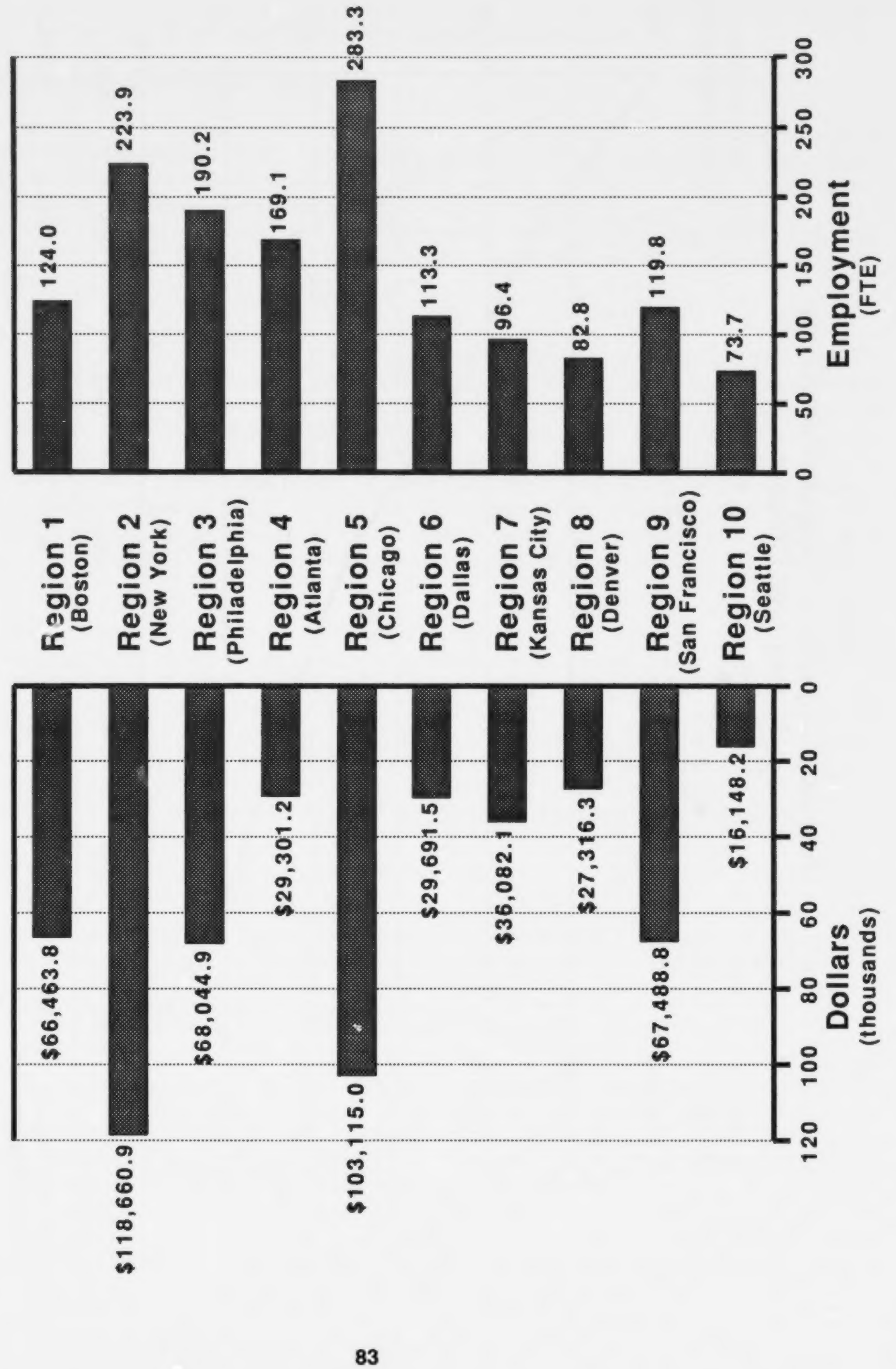
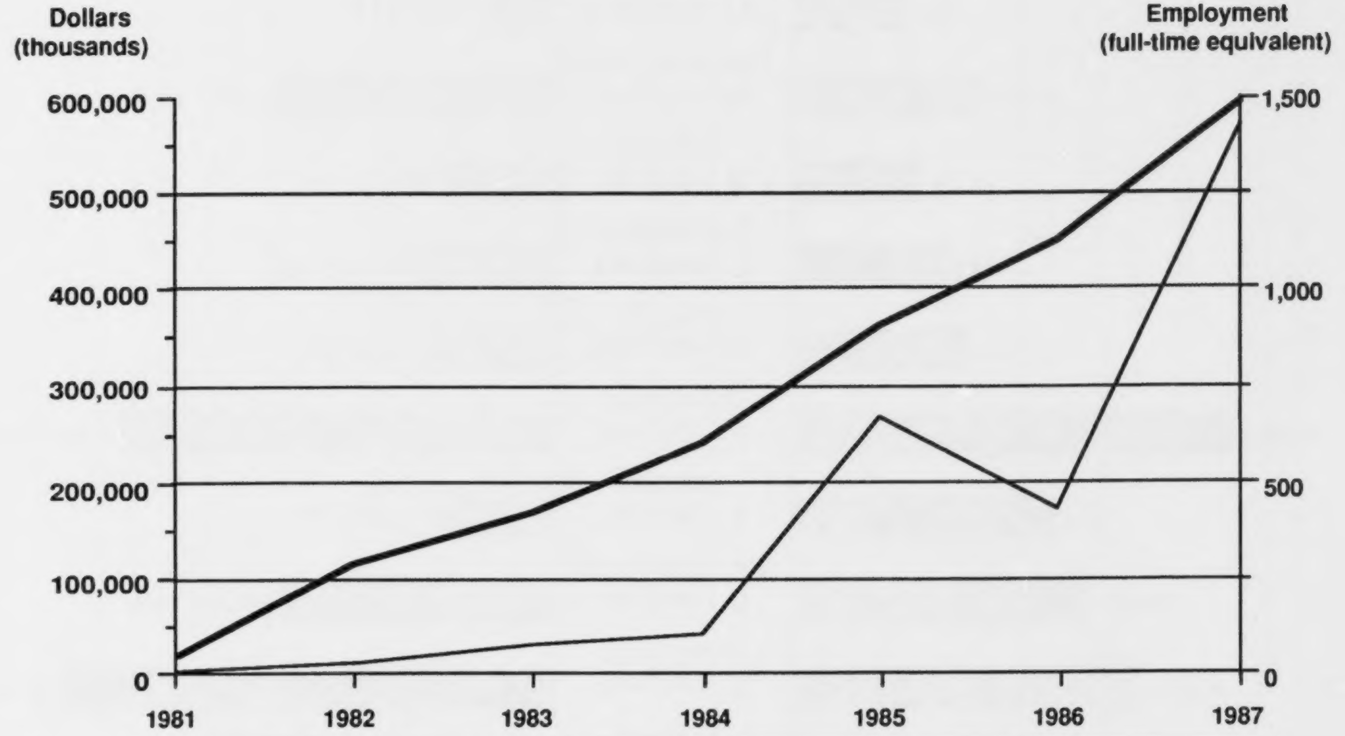


Exhibit 5.4-2

Historical Superfund Program Resources to Regional Offices*



	1981	1982	1983	1984	1985	1986	1987
━ Full-time equivalent	44.9	289.4	421.0	602.0	904.3	1,125.5	1,476.5
— Dollars	$2,362.4	$11,801.4	$29,222.1	$42,953.4	$267,485.9	$173,596.6	$562,312.6

* Dollar amounts are funds obligated as of September 30 of the fiscal year; they include funds appropriated in each fiscal year and funds carried over from previous fiscal year appropriations.

Agency utilized a total of $66,148,000 for Superfund general interagency support to other Federal departments and agencies, including Superfund Interagency Budget transfers and site-specific interagency agreements.

5.4.1 EPA Superfund Program Activities

EPA utilized a total of $984,600,900 (94 percent of the total amount obligated from the Trust Fund) to conduct Superfund implementation activities under the Hazardous Substance Response, Enforcement, Management and Support, and Research and Development programs. These activities were supported by a total of 2,174.3 workyears at both EPA Headquarters and in the Regional offices. Exhibits 5.4-3, 5.4-4, and 5.4-5 illustrate current and historical resource utilization.

Hazardous Substance Response

The two Hazardous Substance Response programs, Spill and Site Response and Hazardous Substance Response Support, are utilized to protect public health and the environment from dangers associated with releases of hazardous substances into the environment. These programs provide the necessary funding and support to undertake short-term emergency responses and long-term site cleanups. Activities include responding to spills and emergency releases of hazardous substances, conducting remedial work at abandoned hazardous waste sites, and providing training and technical support to Agency, State, and local government personnel.

The majority of the work performed under the Spill and Site Response program was geared toward implementing CERCLA provisions and regaining the momentum of the Superfund program. The regulatory and guidance framework for the removal program was completed, including the use of revised removal authorities and the promulgation of final regulations on CERCLA notification, reportable quantities, and the designation of additional hazardous substances. The Agency focused its remedial efforts on initiating RI/FSs at NPL sites and beginning design and implementation at sites where planning was completed.

Enforcement

The primary goal of Superfund enforcement activities is to achieve the maximum possible response from potentially responsible parties. Superfund enforcement activities are conducted through four programs: Technical Support - Office of Enforcement and Compliance Monitoring (OECM); Technical Enforcement; Legal Enforcement; and Criminal Investigations.

The OECM program supports the Superfund activities of the National Enforcement Investigations Center (NEIC), including special environmental monitoring work, evidence audit control processes to ensure proper chain-of-custody procedures, cleanup of Federal facility sites, and nonbinding preliminary allocations of responsibility. The Technical Enforcement Program develops the technical documentation for Superfund enforcement and initiates enforcement actions. The Legal Enforcement program provides the legal staff for CERCLA enforcement. EPA Headquarters support for judicial enforcement under this program increased in 1987 as EPA set precedents with new types of

Exhibit 5.4-3

Fiscal 1987 Superfund Resources by Program Function

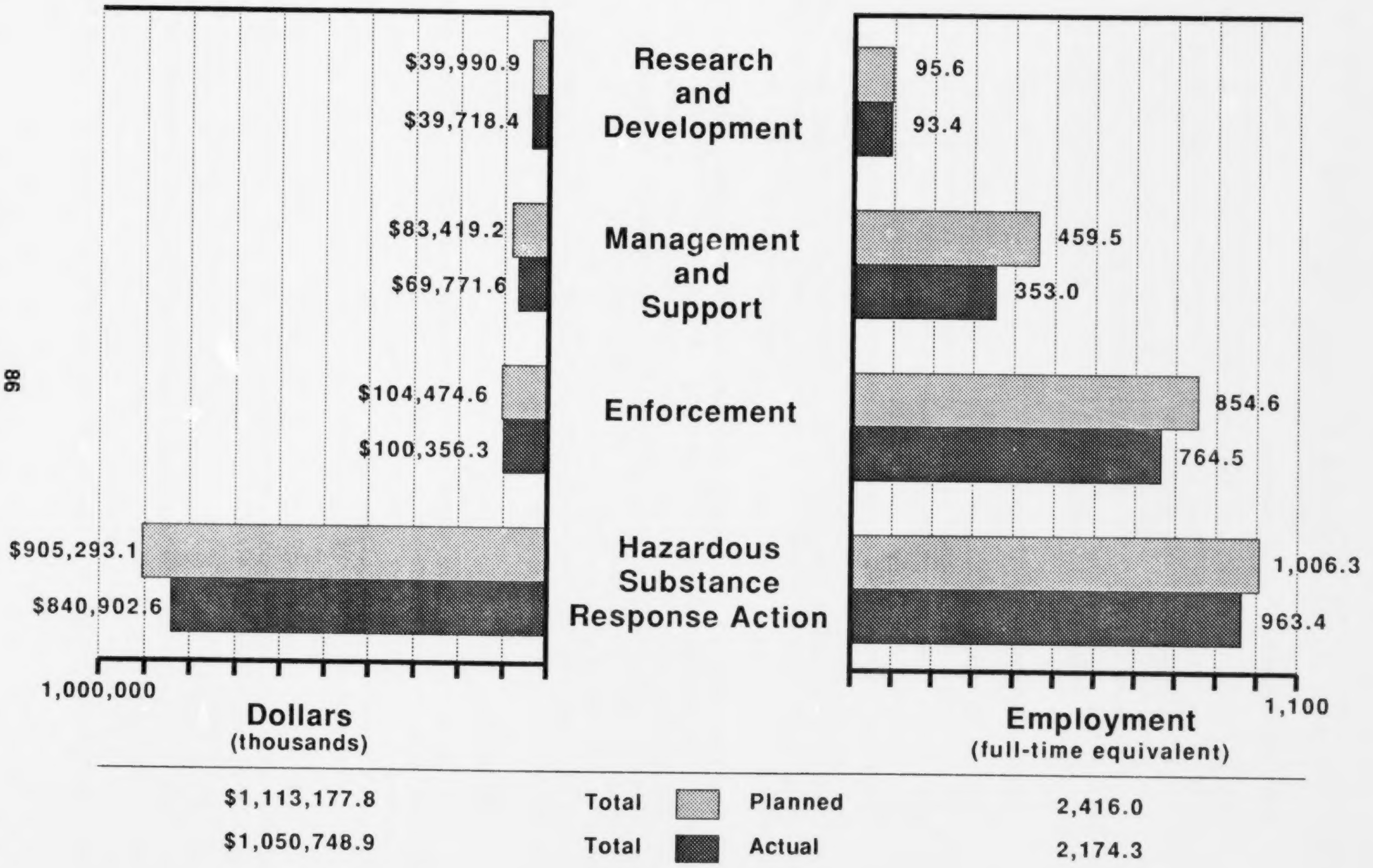


Exhibit 5.4-4

Fiscal 1987 Superfund Resources by EPA Office and Function

EPA Office Function	Dollars (in thousands)	Full-Time Equivalent
Hazardous Substance Response Action	$840,902.6	963.4
AA Air and Radiation	*1,216.5*	*7.5*
AA Water	*1,803.9*	*9.5*
AA Pesticides and Toxic Substances	*5,079.1*	*2.7*
AA Solid Waste and Emergency Response	*832,803.1*	*943.7*
Enforcement	100,356.3	764.5
AA Pesticides & Toxic Substances	*1.9*	-
AA Solid Waste and Emergency Response	*82,948.5*	*529.7*
AA Enforcement and Compliance Monitoring	*17,405.9*	*234.8*
Management and Support	69,771.6	353.0
AA Research and Development	*216.9*	-
AA Administration and Resources Management	*59,955.9*	*269.1*
AA External Affairs	*47.8*	*5.0*
Administrator/Staff	*87.5*	-
Inspector General	*4,581.2*	45.7
General Counsel	*1,399.8*	*29.7*
AA Enforcement and Compliance Evaluation	*47.8*	*8.0*
Research and Development	39,718.4	93.4
AA Research and Development	*39,718.4*	*93.4*
Superfund Total*	$1,050,748.9	2,174.3

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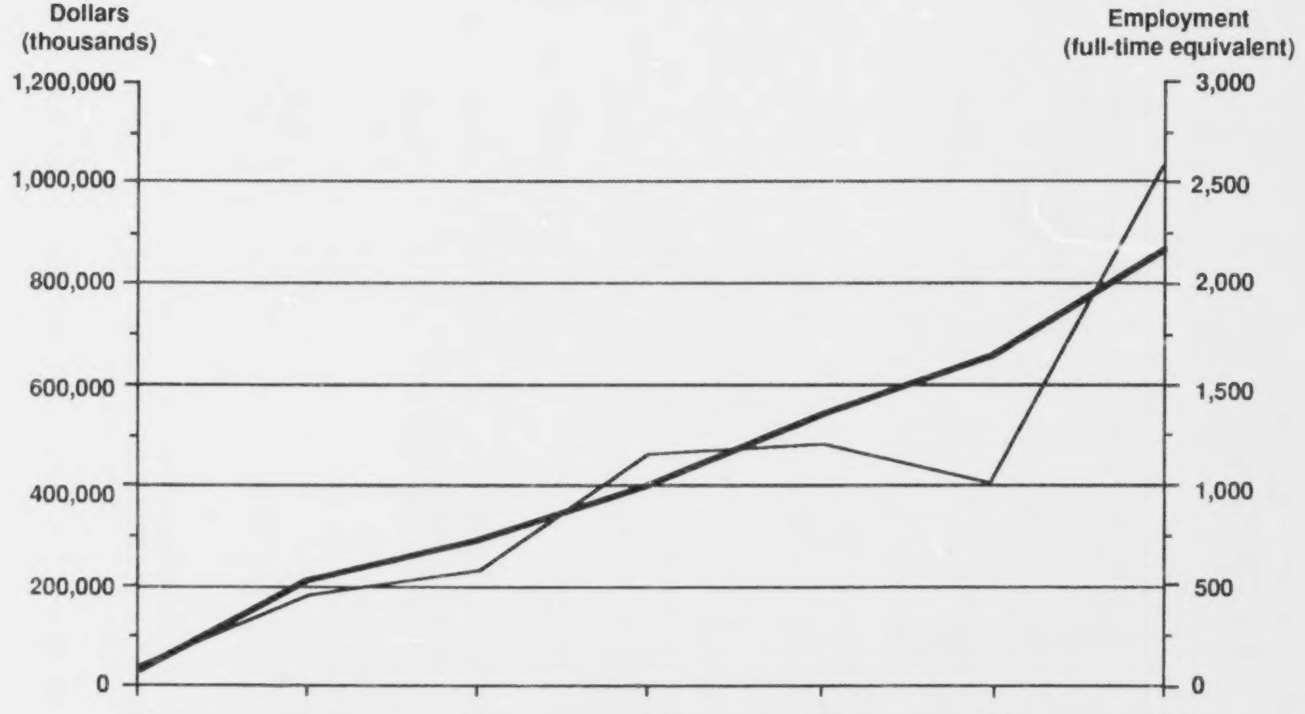
*Includes resources utilized for interagency support and SARA Title III activities.

Exhibit 5.4-5

Historical Superfund Program Resource Distribution*



	1981	1982	1983	1984	1985	1986	1987
Dollars	$40,283.1	$180,743.6	$230,233.4	$465,619.4	$483,116.0	$406,268.8	$1,050,748.9
Full-time equivalent	75.3	527.7	724.8	996.3	1,350.3	1,642.8	2,174.3

* Dollar amounts are funds obligated as of September 30 of the fiscal year; they include funds appropriated in each fiscal year and funds carried over from previous fiscal year appropriations.

enforcement activities, such as *de minimis* settlements, consent decrees with responsible parties to undertake response actions, and civil remedies for reportable quantity violations. The basic purpose of Criminal Investigation, under the direction of NEIC, is to initiate and conduct criminal investigations under CERCLA.

Management and Support

Superfund management and support activities provide the financial, administrative, and support services necessary to manage and implement the Superfund program. These activities include: financial management to track and report on the use of the Hazardous Substance Superfund; administrative management of contracts personnel, information systems, office and laboratory services, and safety training; services for space, utilities, and other non-personnel support needs, including computer services.

Management and support also includes legal services; auditing services; policy analysis and program evaluation; budget development and oversight; effective communication with interested parties outside the Agency; and laboratory support for Superfund research. The Agency performs its Superfund management and support activities under the following nine program areas: (1) Financial Management; (2) Administrative Management; (3) Support Services; (4) Computer Services; (5) Legal Services; (6) Office of the Inspector General; (7) Office of Policy, Planning, and Evaluation; (8) Office of the Comptroller; and (9) Office of Research and Development.

Research and Development

Superfund research and development activities support the Agency, States, and industry in resolving technical problems that inhibit the effective implementation of removal and remedial actions. Much research focuses on adapting existing technologies and scientific information for the purpose of controlling hazardous waste.

Superfund research and development (R&D) activities provide quality assurance protocols and methods for sampling and analyzing hazardous waste materials. Superfund R&D also develops techniques for field response personnel to use in evaluating potential sites, and engineering and other technical guidance for Federal, State, and local officials to use in conducting site cleanup operations. Superfund research also includes evaluation of personal protective devices and engineering controls to protect hazardous waste workers and improve their efficiency. Superfund research and development activities are conducted through the following seven programs: (1) Scientific Assessment; (2) Monitoring and Quality Assurance; (3) Health Effects; (4) Environmental Engineering and Technology; (5) Environmental Processes and Effects; (6) Exploratory Research; and (7) Technical Information and Liaison.

5.4.2 Other Executive Branch Department and Agency Superfund Activities

Two sources of funding meet the resource needs of other Executive branch departments and agencies for CERCLA implementation: (1) monies obligated to these departments and agencies by EPA from the Hazardous Substance Superfund appropriation, and (2) funds independently budgeted by other Federal departments and agencies.

In FY87, EPA transferred a total of $66,148,000 from the Hazardous Substance Superfund appropriation to other Federal departments and agencies. EPA transfers Trust Fund monies to other Federal departments and agencies through an interagency budget process under Executive Order 12580 that utilizes general and site-specific interagency agreements (IAGs). General IAGs, funded through either transfer allocation or reimbursable accounts, provided $51,343,100 for ongoing activities that generally are not incident-specific, such as developing program policies and guidance, training response personnel, and conducting health research. Site-specific IAGs provided $14,804,900 for those activities that are episodic in nature and taken in direct support of specific site or spill response actions. Site-specific activities are generally paid for on a reimbursable basis. Exhibit 5.4-6 presents data on the FY87 Superfund interagency agreements by department and agency.

The second source of funding used to meet other Federal department and agency Superfund resource needs is monies that are independently budgeted by individual departments or agencies for Superfund activities and support as part of the President's annual budget submission. This source of funding for Superfund activities is discussed in Chapter 13.

Department of the Interior

The NCP also designates the Department of the Interior (DOI) as Federal Trustee for certain natural resources either lost or damaged due to hazardous substance releases. DOI provides scientific and technical support in resource damage assessments through its participation on the National and Regional Response Teams.

Department of Transportation

The United States Coast Guard (USCG) is a part of the Department of Transportation (DOT), except when operating under the Department of the Navy in time of war. The USCG is the predesignated On-Scene Coordinator in the Coastal Zone and has the authority under CERCLA to respond to any release or threatened release of hazardous substances involving the shore, Coastal Zone, Great Lakes waters, ports, and harbors. The USCG and EPA share responsibility for the emergency response activities under the NCP. The USCG provides training to maintain this response capability, conducts enforcement activities as necessary in its areas of responsibility, maintains the National Response Center (NRC), and supports the National Response Team and each of the Regional Response Teams. In addition, the USCG (under section 108(a) of CERCLA) enforces the requirements that commercial vessels using U.S. waters must provide evidence of financial responsibility to pay for cleanup in the event of spills.

The Coast Guard utilized 1987 transfer funds to purchase safety equipment, conduct response training for USCG personnel, upgrade the capabilities of the NRC, and provide field data systems to support response programs and minimize the possibility of harm to personnel from exposure to hazardous substances.

Exhibit 5.4-6

Fiscal 1987 Superfund Interagency Support Resources

Federal Department or Agency	Dollars (In thousands)
Department of the Interior	$ 687.0
Department of Transportation	4,023.3
Department of Health and Human Services	32,439.3
Department of Commerce	1,819.9
Department of Justice	10,918.6
Department of Labor	281.3
Federal Emergency Management Agency	1,173.7
Total	$51,343.1

Department of Health and Human Services

Within the Department of Health and Human Services (HHS), the Agency for Toxic Substances and Disease Registry (ATSDR) and the National Institute for Environmental Health Sciences (NIEHS) have certain Superfund responsibilities. ATSDR can investigate complaints of illness or disease related to exposure to hazardous substances, conduct health studies and surveys, develop testing for exposed individuals, and develop and maintain information on the health effects of toxic substances. Under CERCLA, ATSDR must perform health assessments by December 10, 1988 at all sites that were listed on the NPL as of October 17, 1986. HHS develops policies and procedures to ensure a coordinated Federal approach in conducting the above activities. NIEHS administers a training grant program in worker protection and a program for basic research, development, and training to promote better understanding of the effect on human health of exposure to hazardous substances.

With the funds EPA transferred to it, HHS collected the information and developed the procedures necessary to provide continuing health-related support to the Superfund program. Included in these efforts were development of health-related field guidance in support of EPA emergency response actions; development of standard guidelines for health and epidemiological studies at NPL sites; production of worker health and safety technical guidance and field manuals for individuals involved in response actions; and toxicological testing of chemicals found at NPL sites.

Department of Commerce

The National Contingency Plan designates the National Oceanographic and Atmospheric Administration (NOAA) to act on behalf of the Secretary of Commerce as Federal Trustee for natural resources in coastal and marine areas that are lost or damaged due to hazardous substance releases. NOAA also provides scientific and technical support for responses to such releases in coastal and marine waters. Transfer funds received by NOAA provided training for the scientific response team, the purchase and maintenance of protective equipment for personnel, the development and maintenance of field instrumentation, and the development of computerized contingency plans.

Department of Justice

The Department of Justice (DOJ) is responsible for the conduct and control of all litigation under CERCLA. EPA is responsible for preparing the required technical and legal documentation and cooperates with DOJ in negotiating consent decrees for privately financed response actions. With the transfer funds it received from EPA, DOJ provided civil and criminal enforcement litigation, including counseling on and enforcement of administrative orders and warrants for entry, and institution of suits to compel removal and remedial actions and to recover Superfund response costs.

Department of Labor

The Occupational Safety and Health Administration (OSHA) of the Department of Labor is responsible for worker protection at Superfund sites. The OSHA Health Response Team assists EPA and other on-site personnel in protecting workers at Superfund sites and in developing guidelines to improve current methods of worker protection. OSHA utilized transfer funds to provide technical assistance to EPA, initiate a special program for worker safety at Superfund sites, support National and Regional Response Teams, and develop a required worker protection standard.

Federal Emergency Management Agency

The Federal Emergency Management Agency's (FEMA) hazardous materials (HAZMAT) program involves working with Federal, State, and local governments and the private sector to provide guidance, deliver technical assistance, facilitate information sharing, and promote interagency/intergovernmental coordination in the areas of emergency preparedness, response, and mitigation. The overall goal of FEMA's HAZMAT program is to reduce the frequency and severity of hazardous material emergencies by enhancing the prevention and response capabilities of Federal, State, and local agencies, and of the private sector. Much of FEMA's HAZMAT program is accomplished through the National Response Team and the Regional Response Teams. In the event of an emergency, FEMA assists in the temporary or permanent relocation of individuals whose health is threatened by the release of hazardous materials.

6.0 EPA RULEMAKING ACTIONS TO IMPLEMENT CERCLA

SARA created many new regulatory authorities under CERCLA. In response to these new authorities, and as part of ongoing rulemaking activities, EPA and other Federal agencies involved in the Superfund program initiated a significant number of rulemakings during FY87.

Rulemaking activities that address specific Report chapter topics are discussed in the appropriate chapter sections: reportable quantities (2.1); the remedial program (2.3); and State involvement (3.2). Additional rulemaking activities were undertaken for the following other regulatory authorities.

6.1 Designation of Hazardous Substances Under CERCLA Section 102(a)

In the preambles to rulemakings published on March 16, 1987 (52 *FR* 8140, 8142) and April 22, 1987 (52 *FR* 13378, 13392), the Agency indicated that it intends to designate as hazardous substances under section 102(a), 232 substances originally listed as Extremely Hazardous Substances (EHSs) under section 302 of SARA. Section 102(a) of CERCLA authorizes the Administrator of EPA to promulgate regulations designating as a hazardous substance any substance that, when released into the environment, may present substantial danger to public health or welfare or the environment. The notification and liability provisions of CERCLA apply only to substances designated as hazardous substances under the statute. Although EPA may take actions to respond to releases of pollutants or contaminants that are not CERCLA hazardous substances, the Agency cannot recover the costs of such response actions pursuant to section 107, as it can in the case of response actions involving CERCLA hazardous substances. The proposed rule to designate the non-CERCLA EHSs was published in the *Federal Register* on January 23, 1989 (54 *FR* 3388). Currently, there are 725 CERCLA hazardous substances.

Past and Ongoing Activities

On May 25, 1983, EPA issued an Advance Notice of Proposed Rulemaking (48 *FR* 23602) soliciting comments on approaches for determining which substances should be proposed for designation as hazardous substances under CERCLA section 102(a). EPA continues to examine designation approaches and candidate lists of substances; once a methodology has been prepared for identifying a candidate list and for selecting substances from these lists, EPA will propose additional substances for designation in future rulemakings.

6.2 Payment of Research Costs Under CERCLA Section 104(i)(5)(D)

EPA took no action to implement CERCLA section 104(i)(5)(D). Under this section potentially responsible parties are liable for the costs of research under section 104(i). The existing regulations under the Toxic Substances Control Act (TSCA) and the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) allow EPA to pass the major portion of research costs on to the potentially responsible parties. In many cases, the costs of research conducted under these programs are already borne by the manufacturers, processors, and registrants of the substances. EPA, therefore, has determined that further regulations are unnecessary.

6.3 National Contingency Plan Under CERCLA Section 105

Early in the fiscal year, EPA began a broad and comprehensive rulemaking process to revise and restructure the NCP. The NCP is the primary regulation directing government and potentially responsible party response to and cleanup of discharges of oil and releases of hazardous substances, pollutants, and contaminants. CERCLA section 105 mandates that the NCP be revised within 18 months of the date of enactment of SARA to incorporate statutory revisions relating to selection of remedy. To carry out the rulemaking EPA formed a workgroup that included staff from EPA Headquarters and Regional offices, as well as representatives of the States and other Federal Agencies. The Agency formed sub-workgroups for selection of remedy and State-involvement issues. The NCP workgroup met 16 times during FY87, and numerous sub-workgroup meetings were held. EPA management was briefed and consulted on a regular basis. EPA held its closure meeting covering many parts of the NCP revisions in September 1987. Closure on remaining items occurred in the first quarter of fiscal 1988, at which time EPA consulted the NRT as required by Executive Order 12580. The proposed NCP was published in the *Federal Register* in December 1988 (53 *FR* 51394).

The primary purposes of the rulemaking is to incorporate changes mandated by CERCLA, as amended, and to set forth EPA's approach for implementing CERCLA. In addition, the revisions:

- Reorganize the NCP to coincide more accurately with the sequence of response actions taken pursuant to the NCP;
- Clarify existing language on roles, responsibilities, and activities of affected parties; and
- Incorporate changes indicated by program experience since the last revisions to the NCP in 1982.

When the revised NCP is promulgated all existing subparts will be revised (with some consolidation), and several new subparts will be added.

The major substantive revisions to the NCP are included in a revised subpart detailing the response process and new subparts on State involvement and the administrative record. Among the significant issues being addressed in the NCP revision are:

- Selection of remedy steps and criteria;
- State involvement in response activities;
- The purpose of the NPL;
- Compliance with ARARs; and
- Development of the administrative record.

Revision of the HRS, an appendix to the NCP, also was undertaken during FY87. Discussion of activities surrounding that revision is included in section 2.3.5 of this Report.

6.4 Financial Responsibility Under CERCLA Section 108

During the fiscal year, the Office of Solid Waste requested $100,000 from the Superfund to pursue implementation of CERCLA section 108. SARA supplemented the existing provisions in CERCLA section 108 on the proof of financial responsibility to be required from owners and operators of vessels and from other PRPs and on the handling of claims against their guarantors and insurers. SARA supplements CERCLA section 108(b)(2) to describe ways in which the financial responsibility of those involved with the production, transportation, treatment, storage, or disposal of hazardous substances can be evidenced. The President is authorized to promulgate regulations to implement these requirements.

6.5 Awards Regulations Under CERCLA Section 109(d)

The Agency published interim final regulations implementing CERCLA section 109(d) in the *Federal Register* in May 1988. SARA amended section 109(d) to allow for the payment of an award of up to $10,000 to any individual who provides information that leads to an arrest and conviction of a person for a criminal violation under CERCLA. Section 109(d) authorizes the President to promulgate regulations prescribing criteria for these awards.

6.6 Review of Denied Claims Under CERCLA Section 112(b)(2)

Prior to the enactment of SARA, section 112(b)(4) of CERCLA required creation of a Board of Arbitrators to review EPA's claim determination if a claim was denied or a claimant disputed the amount of an award. Section 112(b) of SARA revoked the statutory authority for an arbitration board and, in its place, amended CERCLA 112(b)(2) to allow a claimant to request an administrative hearing if all or part of a claim is denied. Consequently, EPA on September 8, 1987 (52 *FR* 33812), withdrew its rule at 40 CFR 305 for arbitration and is currently drafting a rule for administrative hearings of denied claims.

6.7 Indemnification of Response Action Contractors Under CERCLA Section 119(c)

On October 6, 1987, EPA issued interim guidance on indemnification of Superfund response action contractors (RACs) under section 119 of CERCLA (OSWER Directive #9835.5). The interim guidance contains general section 119 indemnification guidelines and procedures for EPA Headquarters and Regional contracting personnel and indemnification contract language. EPA is currently working on final indemnity guidance and plans to publish (for public comment) a proposed guidance in the *Federal Register* in 1988. After reviewing the public comments, EPA plans to issue a final guidance document and to promulgate regulations concerning RAC indemnification, as required by section 119.

All RACs have had their contracts modified to reflect the requirements of section 119. In addition, several contractors working for States at Superfund sites have entered into indemnity agreements with EPA, pursuant to section 119.

6.8 Reimbursement to Local Governments Under CERCLA Section 123(d)

On October 21, 1987 an interim final rule under CERCLA section 123(d) was published in the *Federal Register* authorizing reimbursement to local governments. The costs incurred in providing temporary emergency measures in response to releases of hazardous substances can be reimbursed for up to $25,000 per incident. The rule was published just four days beyond the statutory deadline of October 17.

6.9 Natural Resource Damage Assessment Reimbursement Under CERCLA Section 301(c)(1)

CERCLA section 301(c)(1) authorizes the President to promulgate regulations prescribing procedures for the reimbursement of costs incurred by Federal and State officials and Indian tribes in assessing damages resulting from the injury, destruction, or loss of natural resources. The Department of the Interior published general, standardized procedures under section 301(c)(2)(A) on March 20, 1987 (52 *FR* 9042). Administrative and site-specific procedures under section 301(c)(2)(B) were published on August 1, 1986 (51 *FR* 27674). The proposed rule to provide amendments to the final natural resource damage assessment regulations, mandated by SARA and required to be promulgated no later than April 17, 1987, was published on that date (52 *FR* 12886) by the Interior Department. The final rule was published on February 22, 1988 (53 *FR* 5166).

SARA section 517(a), however, amended the Internal Revenue Code to prohibit expenditures for the purpose of carrying out those provisions of CERCLA section 111 that authorized claims submitted by Federal, State, or Indian Tribe trustees for reimbursement of the costs of assessing damage to a natural resource, or for the restoration of a natural resource that had been injured, destroyed, or lost. Consequently, on September 8, 1987, EPA withdrew the rule (40 CFR 306) and the regulatory procedures (40 CFR 305) it had promulgated for evaluation and submission of natural resource claims (52 *FR* 33812).

6.10 Health and Safety/Worker Protection Standards Under SARA Section 126(a), (e), and (f)

As required by SARA section 126(e), the Secretary of Labor promulgated in the Federal Register on December 19, 1986 (51 *FR* 45654), interim final regulations on standards for the health and safety protection of employees engaged in hazardous waste cleanup operations. By October 17, 1987, the Secretary was to have promulgated final regulations under section 126(a), with an effective date one year later. The Notice of Proposed Rulemaking appeared in the Federal Register on August 10, 1987 (52 *FR* 29620); the final rule was promulgated on March 16, 1989.

Under SARA section 126(f), and within 90 days of the final regulations promulgated by the Secretary of Labor, the Administrator of EPA must promulgate identical standards for State and local government employees not covered by State plans approved under section 18 of the Occupational Safety and Health Act of 1970.

7.0 DEVELOPMENT AND EVALUATION OF PERMANENT TREATMENT TECHNOLOGIES

7.1 Overview

Section 301(h)(1)(D) of CERCLA requires the Administrator of EPA to submit as part of his Annual Report to Congress an evaluation of newly developed feasible and achievable permanent treatment technologies. The technologies potentially subject to such an evaluation could range from those able to treat source materials to those designed to deal with contaminated ground water. Although EPA does not have a comprehensive program that systematically monitors the commercial and research environment to identify and evaluate such technologies, several important activities are underway.

In Superfund's 7-year history, it has become apparent that a premium must be placed on the use of permanent treatment technologies in conducting response actions. The most common response method in use today is land disposal; yet, it is neither completely reliable nor permanent. Continued use of inherently temporary and potentially unreliable methods such as land disposal can be expensive and inefficient over the long run because of the recurring need to monitor and replace defective waste disposal containers. While some alternative treatment methods are coming into use, overall, the development of new treatment technologies has proceeded very slowly. SARA included provisions to encourage EPA to conduct more research and development of hazardous waste treatment technologies.

During fiscal year 1987, EPA took several steps toward establishing a steady stream of new treatment technologies in the development pipeline. Most importantly, the first demonstration of new treatment technologies under the SITE Program was completed, and five more demonstrations are currently planned.

Also, other EPA activities not specifically directed towards technology development are, nonetheless, generating new technology uses. These include:

- Treatability studies, undertaken as part of the feasibility study, to determine the effectiveness of different remedies;
- The Superfund Technology Support Project (STSP), a technical assistance program to encourage the use of new technologies; and
- A survey of treatment technologies used worldwide.

7.2 Superfund Innovative Technology Evaluation Program Design

Section 209(b) of SARA amends Title III of CERCLA by adding Section 311, which directs the Agency to establish an "Alternative and Innovative Technology Research and Demonstration Program." This Congressional mandate codified EPA's existing Superfund Innovative Technology Evaluation (SITE) program, which had been created the year before. The SITE Program is intended to: (1) accelerate the development, demonstration, and use of new or innovative treatment technologies; and (2) demonstrate and evaluate new, innovative measurement and monitoring technologies. Section 311(e) of CERCLA requires an annual progress report (at the time of the annual budget submission) on the demonstration program the Agency is conducting. EPA submitted its first SITE report to Congress in February 1988.

There are five components to the SITE program. Three of the components concern the development of new treatment technologies:

- The Demonstration Program,
- The Emerging Technologies Program, and
- The Innovative Development and Evaluation Program.

Of these three programs, only the demonstration program was operating in FY 1987. The Emerging Technologies Program and the Innovative Development and Evaluation Program were expected to begin operation in FY 1988 and are not discussed in this Report.

Section 7.2.2 of this report discusses the other two SITE program components:

- The Measurement and Monitoring Techniques Development Program, and
- The Technology Transfer/Clearinghouse Program.

7.2.1 Superfund Innovative Technology Evaluation Demonstration Program

The demonstration program is charged with finding new technologies that can meet the new cleanup standards under CERCLA requiring greater reliance on permanent remedies. The program's main focus is to provide sound engineering and cost data on selected new technologies to aid in Superfund decisionmaking.

EPA uses two methods of identifying SITE participants:

- CERCLA section 311(b)(5)(B) solicitations, and
- Evaluation of technologies used by EPA's Regional offices.

CERCLA section 311(b)(5)(B) requires the Administrator to publish solicitations for innovative and alternative technologies suitable for full-scale demonstration at Superfund sites. Two solicitations have been issued; the first on March 15, 1986 and a second on January 15, 1987. The technologies chosen must be at pilot or full scale, be innovative, and offer some advantage over existing technology. Mobile technologies are of particular interest. After consultation with EPA Regional staff and the developer, the Agency chooses for these demonstrations sites where the wastes would best illustrate the capabilities of the new technology.

A second method EPA used to identify SITE participants was an evaluation of technologies used by EPA's Regional offices during removal and remedial response actions.

Demonstration Program Reports

Each demonstration program project results in two final reports:

- A technical report that documents the performance data resulting from the demonstration and summarizes its findings in terms of effectiveness, reliability, and cost; and
- A report that evaluates the degree to which each technology applies to other sites and wastes, the limitations of the process, and its economics. The report should provide the decisionmaker with enough information to make a preliminary decision as to whether this process can be used to treat a specific problem.

In general, both reports should be available 6 to 8 months after the demonstration is completed. These reports are distributed to Federal and State hazardous waste cleanup offices and are also available through the Center for Environmental Research Information (CERI) in the Office of Research and Development, and the hazardous waste collection in the EPA library.

The Fiscal 1987 Demonstration Program

EPA worked with 11 technologies that were selected during FY86; one demonstration was completed during the year. An additional demonstration was completed just after the close of the fiscal year, and four more were completed during the winter of 1987/88. Another five technologies have not yet been scheduled for demonstration, either because a site could not be found to match the technology, the technology is not at full scale development, or permitting requirements have slowed the process.

Although a twelfth developer, Waste-Tech Services, Inc., was selected under the first solicitation to demonstrate its fluidized bed combustion technology, Waste-Tech notified EPA in July 1987 of its withdrawal due to indemnification issues.

Completed Demonstrations

Two SITE demonstrations have been completed. The first demonstration was conducted from July 31 to August 6, 1987, at the Peak Oil Superfund site in Tampa, Florida (EPA Region 4), by Haztech, Inc., of Atlanta, Georgia. This demonstration used a transportable, 100-ton per day, thermal destruction system technology developed by Shirco Infrared Systems, Inc. The Shirco process uses rows of electrically powered silicon carbide rods to bring the waste to combustion temperatures and then destroys any remaining combustibles in an afterburner. The full-scale system can process from 100 to 250 tons of waste a day, depending on the waste characteristics.

During the demonstration, EPA SITE staff conducted a trial burn (three 8-hour runs) and extensive sampling. All operating conditions during the runs were documented. By mid-October, the phase of the removal action involving the use of the Shirco System was completed. A total of 7,000 cubic yards of waste material had been processed. A final technical report on the demonstration was completed in the summer of 1988.

The second demonstration was conducted from October 13 to 16, 1987, at the Douglasville Disposal Superfund site in Douglasville, Pennsylvania (EPA Region 3), by Hazcon, Inc., of Katy, Texas. A solidification/stabilization process technology was used in the demonstration.

The Hazcon process blends contaminated soil with cement, pozzolans, and a proprietary ingredient called chloranan, which aids in the solidification of organics. Solidified blocks were returned to the excavation hole and will be monitored for integrity over a 5-year period. A final technical report is scheduled to be completed in the summer of 1988.

Demonstrations Underway

- American Combustion, Inc. of Norcross, Georgia, completed the demonstration of the Pyretron, an oxygen-air-fuel burner, which can be fitted to a conventional rotary kiln. This technology was demonstrated at EPA's Combustion Research Facility at Jefferson, Arkansas. Contaminated soil from the Stringfellow Acid Pit site in Glen Avon, California (EPA Region 9) was processed.

- Shirco Infrared Systems of Dallas, Texas, demonstrated a portable, one-ton per day, pilot Shirco unit incineration technology at the Rose Township-Demode Road Superfund site in Rose, Michigan (EPA Region 5). The one-ton per day unit is similar to the 100-ton per day unit except for waste capability and size.

- Demonstration of an *in situ* vacuum extraction process was completed at the Groveland Wells Superfund site in Groveland, Massachusetts (EPA Region 1) by Terra Vac, Inc., of Dorado, Puerto Rico. The process consists of installing subsurface wells and introducing a negative pressure gradient through the use of vacuum pumps. The resulting air-streams that come from the wells are then extracted and pulled through a separator device and activated carbon for adsorption of the volatile compounds before the vapor is discharged to the atmosphere. The process has been applied to a wide range of volatile compounds, as well as organic and chlorinated solvents.

- International Waste Technologies (IWT), in conjunction with Geo-Con, a deep soil mixing equipment company, demonstrated an *in situ* stabilization system at the General Electric, Inc., site in Hialeah, Florida (EPA Region 4). This project demonstrated a system that treats waste without excavation. The Geo-Con equipment injects the slurry additive from the bottom of the shaft of a hollow earth auger. IWT claims the process ties up, or bonds, organic and inorganic compounds, creating "macromolecules" in vertical columns that are highly resistant to acids and other deteriorating factors.

Technologies Selected from First Proposal Solicitation But Not Yet Underway

The following five technologies selected in FY86 were not demonstrated in FY 1987 either because a site had not yet been selected, the technology was not yet at full scale, or permitting requirements slowed the process.

- The Basic Extraction Sludge Technology™ was developed by Resources Conservation Company of Bellevue, Washington. A chemical plant-like process, it uses differences in chemical miscibility at different temperatures to break down waste into three distinct fractions: (1) dischargeable water; (2) reusable oil and organics; and (3) dry, oil-free solids. The transportable system was used as part of an EPA removal action at a Savannah, Georgia, site. The developer collected sampling and performance data, which ORD is evaluating. If the results show the unit is able to operate at full scale, a demonstration will be conducted when a suitable site is selected.

- Detox Industries, Inc. of Sugarland, Texas, developed a technology involving application of proprietary, naturally occurring and non-pathogenic organisms for biological degradation of contaminants. The process involves accelerating the growth of proprietary microorganisms and inoculating them into the waste matrix. The result is a systematic biodegradation of the contaminants over a relatively short time, usually 2 to 4 months. A SITE demonstration with Detox has been proposed for an EPA Region 6 Texas Superfund Site. The Agency is assisting the State of Texas with an investigation of treatment technologies that may permanently clean up the site.

- A Westinghouse Electric Corporation transportable electric pyrolyzer unit and a transportable plasma arc unit have also been selected for demonstration. The transportable electric pyrolyzer unit transforms a molten mixture of halogens, metals, and other impurities into a vitrified residue that should be leach resistant.

  The transportable plasma arc unit employs electric arc technology that uses high temperatures to produce a plasma from pumpable waste. The waste is reduced in an oxygen-deficient atmosphere and reforms into hydrogen, carbon monoxide, hydrogen chloride, nitrogen, particulate carbon, and carbon dioxide. Currently, both units are undergoing development testing at Westinghouse's southwestern Pennsylvania facility. Once these units are ready for demonstration, EPA will select a Superfund site.

- A Pyrolysis Systems, Inc. plasma arc unit designed for thermal destruction of contaminants was also selected. This smaller plasma arc unit, owned by the State of New York, was intended to treat dioxin-contaminated sludge from the Love Canal site. In January 1988, New York State advised EPA that it was withdrawing from the program due to contractual support problems with Pyrolysis Systems.

- A circulating fluidized bed combustor from Ogden Environmental Services was selected for demonstration. This combustor operates at a higher velocity airflow and produces a much higher combustion efficiency than a conventional fluidized bed. The unit employs simultaneous limestone injection that captures the acid gases and eliminates the need for a scrubber. The unit can recover heat as steam, electricity, hot water, or hot air. EPA and the State of California planned to use this combustor at Ogden's facility near San Diego, California, to run treatability tests on several Superfund wastes. EPA was to evaluate these tests under the SITE program.

  EPA and the State of California issued the necessary permits for operation of the facility. The City of San Diego, however, declined to issue a local use permit. Currently, EPA is working with Ogden to find a site on which to demonstrate a transportable unit it has developed.

Plans for Fiscal 1988

EPA has chosen 10 technologies to be demonstrated at Superfund sites from among the proposals submitted in response to the second solicitation for proposals. While the first solicitation proposals consisted mainly of various thermal processes, these 10 technologies are primarily biological and solidification/ stabilization processes. The EPA Regional offices have nominated Superfund sites for the 10 new technologies, and final site selections were made in FY88.

7.2.2 Measurement and Monitoring Techniques Development Program and Technology Transfer Program

Two additional components of the SITE program were developing during fiscal 1987: the Measurement and Monitoring Techniques Development Program and the Technology Transfer/Clearinghouse Program. Activities related to these two components are described below.

The Measurement and Monitoring Techniques Development Program has four goals:

- To assess the extent of contamination at a site;
- To supply data and information to determine the effect on human health and the environment;
- To supply data to select appropriate remedial action; and

- To monitor the success or effectiveness of the selected remedy.

Through the Environmental Monitoring Systems Laboratory (EMSL) in Las Vegas, Nevada, EPA has developed the following monitoring/measurement technologies.

- Immunoassays for toxic substances; and
- Fiber optic sensing for *in situ* analysis at Superfund sites.

In the immunoassay program in FY87, the Agency participated in the development and evaluation of a monoclonal-antibody-based immunoassay for pentachlorophenol. Under the fiber optics program in FY87, resources have been used to improve the fiber optic sensor for chloroform. The latest modifications will allow field measurement of chloroform concentrations in soil gases above contaminated ground water at lower levels than currently used in field methods, i.e., portable gas chromatography.

7.2.3 Technology Transfer/Clearinghouse Program

Recognizing that access to treatment information is essential to the acceptance and use of alternative technologies, the SITE program has developed a Technology Transfer/Clearinghouse Program that will collect, synthesize, and disseminate technology performance data. EPA will document SITE demonstration results in reports to be made available to Federal, State, and private cleanup managers and other interested parties. Existing Agency operations will be utilized to implement clearinghouse operations, e.g., the RCRA/CERCLA hotline, the OSWER Technology Transfer Bulletin Board, and the EPA library's Hazardous Waste Collection.

The clearinghouse has three components:

- A Hotline provides callers with up-to-date information on SITE projects, demonstration schedules, and the availability of the results, and also refers callers to other sources of information.
- An electronic bulletin board, part of a planned computerized data base network, provides summary information on the SITE projects, demonstration schedules, and results. Currently, this bulletin board is available only to Federal and State hazardous waste cleanup personnel.
- A collection of reports, journals, and other documents is housed in the EPA library's Hazardous Waste Collection. This collection is available at EPA's 10 Regional and five laboratory libraries. The bibliographic data base is accessible using a personal computer. SITE documents will be added as they become available.

EPA is in the second phase of the clearinghouse implementation and plans to include pertinent data generated by other Agency programs, such as RCRA trial burn data and ORD's water treatability data base, and other Federal agency and State hazardous waste cleanup projects.

7.3 Treatability Studies

Treatability studies are used to evaluate the potential effectiveness of a technology (or series of technologies) in treating Superfund wastes at an NPL site. The studies are conducted as part of some RI/FSs at NPL sites, with cost and reductions in waste volume, toxicity, or mobility the primary factors influencing an initial selection. For example, the results of a treatability study will indicate how effective a given technology will be in treating contaminated soils. If the technology is found effective, it may be proposed as one of the several remedial alternatives and selected as the final remedy.

Some remedies selected during fiscal year 1987 involved the use of treatment technologies based on information from preliminary treatability studies collected during the RI/FS. In these cases, a full treatability study was deferred until the remedial design phase of the project. The number of treatability studies conducted during RI/FSs is expected to increase in fiscal 1988. Expanding the application of existing technologies complements the development of new technologies, and increases the number of waste treatment alternatives potentially available to Superfund actions.

Special Treatability Studies

At the request of the Superfund program, the Office of Radiation Programs (ORP) is conducting two special treatability studies on radium contaminated soil from several Superfund sites. The studies are designed to develop and evaluate several technologies for possible use in treating radium-contaminated soil at the Montclair and Glen Ridge Superfund sites. Two major projects are underway, the Volume Reduction/Chemical Extraction (VORCE) project and the Volume Reduction Research project (VORRP).

The VORCE project consists of several studies examining methods to significantly reduce the quantity of radioactive soil that must be disposed of or shipped offsite. Topics being studied include: the general chemistry of soils; the distribution of radioactivity in soil particle size fractions; the mineralogy of particles in selected high-radioactivity fractions; treatment of larger particles, primarily with dilute washing solutions; and treatment with complexing agents or high-concentration acid solutions (leaching) to remove radioactivity. Soils from two New Jersey sites are being used for this project, which is expected to result in a demonstration program project in mid-1989. The studies are being done at ORP's Eastern Environmental Radiation Facility.

VORRP uses the "Tru Clean" process and equipment, a Department of Defense owned jig system, for separating soils by size and specific gravity. The project is being managed by ORP and operated at the Department of Energy Nevada Test Site. Contaminated soil from three NPL sites is being used for the VORRP, which is expected to be completed by mid-1988.

7.4 Superfund Technology Support Project

An essential complement to the increased development of new permanent treatment technologies is an information transfer/technical assistance program to encourage field use of these new technologies. EPA initiated such a program in FY 1987: the Superfund Technology Support Project. The project is designed to provide EPA personnel, State Superfund organizations, potentially responsible parties, and the public with technical assistance, demonstration, training, and information about the best demonstrated technologies for application at Superfund sites as rapidly as possible. The project has six components:

- Contractor Assistance;
- A High Technology Demonstration and Training;
- An Information Clearinghouse;
- Rotational Assignments (to enable EPA personnel to familiarize themselves with all aspects of Superfund);
- Site Technology Reviews; and
- A Superfund Technology Hotline.

The EPA laboratories at Las Vegas, Nevada, Ada, Oklahoma, and Cincinnati, Ohio, were given $750,000 each to launch the Technology Support Project. It is expected that four EPA laboratories will be funded under the Technology Support Project in FY88.

7.5 International Survey

To ensure that Superfund sites are treated using the best technology available world wide, EPA has completed an international survey of treatment technologies. A report on the results of the survey, *The Assessment of International Treatment Technologies Available for Superfund Application,* was prepared and will be available to Regions and States. The report identifies technologies for possible licensing and use in the United States. These technologies were evaluated on site during FY 1988.

8.0 TECHNOLOGICAL AND HEALTH-RELATED RESEARCH AND DEVELOPMENT AND TECHNICAL ASSISTANCE

8.1 CERCLA Authority Related to Research and Development as Amended by SARA

CERCLA authorizes a comprehensive Federal research program, with the overall objective of improving the scientific and technical basis of the Agency's risk management decisions at Superfund sites. In FY87, several new research programs were begun that address the need for better assessment of health risks posed by hazardous substances and the need for treatment technologies that provide permanent protection of human health and the environment. Technical support programs that were developed under the original CERCLA were also continued.

Superfund research, development, and demonstration activities at EPA and other Federal agencies were responsive to several CERCLA provisions:

- Section 209 of SARA amends CERCLA by adding section 311(b), which authorizes an EPA program of research, evaluation, testing, development, and demonstration of alternative or innovative treatment technologies that may be utilized in response actions to achieve more permanent protection of human health and welfare and the environment.

- Section 311(c) authorizes EPA to conduct and support, through grants, cooperative agreements, and contracts, research on the detection, assessment, and evaluation of the effects and risks to human health from hazardous substances and detection of hazardous substances in the environment.

- Section 311(d) authorizes EPA to establish up to 10 hazardous substance research centers to conduct research and provide training on the manufacture, use, transportation, disposal, and management of hazardous substances and to publish and disseminate the results.

- Section 104(i) authorizes a research program at ATSDR to develop appropriate methods to determine the health effects of hazardous substances frequently found at Superfund sites. The research will also seek to develop methods to determine the health effects of such substances in combination with other substances (complex mixtures).

- Section 311(a) authorizes a program at NIEHS to develop advanced techniques for detection and evaluation of the effects of hazardous substances on human health; methods to assess the risks to human health presented by hazardous substances; methods and technologies to detect hazardous substances in the environment; and basic biological, chemical, and physical methods to reduce the amount and toxicity of hazardous substances.

- Amended Title 10 of the United States Code (Chapter 160, Environmental Restoration) authorizes the Secretary of Defense to carry out a program of research, development, and demonstration with respect to hazardous waste. The Department of Defense program is directed towards a reduction in the quantities of hazardous wastes; methods for treatment, disposal, and management (including recycling and detoxification); identification of more cost-effective cleanup technologies; collection of toxicological data and methodology on risk of exposure; and the testing, evaluation, and field demonstration of innovative technologies.

Substantial coordination has occurred between EPA and the two Federal departments authorized to conduct technology research under CERCLA: HHS and DOD. A concerted effort has been made to ensure an integrated Federal research program and to avoid duplication of effort.

8.2 Technology Research, Development, and Demonstration

8.2.1 Treatment Technology Evaluation

Site-Surface Treatment

For the treatment of site surface contamination, both surface equipment and *in situ* treatment technologies are being evaluated. In FY87, four major processes were addressed: (1) extraction processes that separate contaminants from the media in which they are found, with emphasis on development of field systems that minimize costs; (2) immobilization processes that permanently bind a contaminant to the existing medium or to a modified medium; (3) detoxification processes that degrade or destroy contaminants using biological, chemical, or thermal techniques; and (4) delivery and recovery processes that are needed for both *in situ* and surface treatment.

Major FY87 accomplishments included: (1) the completion of a handbook on treatment of hazardous waste leachate; (2) evaluation of the Mobile Soils Washing System; (3) additional design modifications for the EPA Mobile Incineration System; (4) preparation of the EPA Mobile Carbon Regenerator for reactivating spent carbon from physical/chemical treatment systems; and (5) development of data on CERCLA waste treatment for use in determining the best demonstrated available technology under RCRA.

Ground-Water Restoration

Two alternatives exist for cleanup of contaminated ground water: pump-treat-recharge and *in situ* treatment. Limited research is being conducted on the conventional water treatment technologies used to treat ground water that is pumped to the surface, but this research area may be reexamined as new technologies and approaches are identified. A low level of research also continues to examine *in situ* ground-water restoration techniques.

8.2.2 Personnel Protection

Personnel protection research is directed at specific safety and cost-efficiency concerns related to use of chemical-protective clothing, equipment, and procedures. Research priorities for FY87 and FY88 were established at a workshop attended by EPA Regional offices, EPA Occupational Health and Safety staff, and Superfund contractors. In FY87, tests were conducted on techniques for in-the-field assessment of clothing degradation, decontamination and reuse procedures, use of personnel coolers to reduce worker heat stress, problems with disposable clothing, and use of robotics and automation.

Interagency coordination is enhanced by a Memorandum of Understanding among EPA, the Coast Guard, the National Institute for Occupational Safety and Health, the Occupational Safety and Health Administration, and the Federal Emergency Management Administration.

8.2.3 Superfund Research Grants

In FY87, EPA established a university research grant program to conduct applied research relevant to Superfund site assessment and cleanup. Grant applications were solicited in two areas: "Measurement and Monitoring Methods for use at Superfund Sites" and "*In Situ* Treatment of Hazardous Waste." In the monitoring area, 20 applications were received and 9 projects were selected for funding, including development of rapid screening techniques, more comprehensive testing protocols, and detection methods that can be used with field-portable equipment. In the treatment area, 46 applications were submitted and 5 were selected for funding. A range of treatment techniques are involved, including biological treatment that focuses on chlorinated organic compounds, polyaromatic hydrocarbons, and arsenicals. EPA funded five additional applications received in the general grants program.

8.3 Health-Related Research and Development

CERCLA authorizes significant new health research programs in EPA and HHS. Although the statute does not clearly differentiate among research areas and agencies in the health research area, a broad research agreement was reached on the scope of each agency program. The EPA research program will focus on the development and evaluation of toxicological test methods, exposure assessment methodology, and risk assessment and characterization techniques. The ATSDR will conduct research related to its health assessment responsibilities under CERCLA. The NIEHS will support multidisciplinary biomedical research through grants to universities.

8.3.1 EPA Health Effects, Risk Assessment, and Detection Research

The Program's objective is to improve the scientific capability for detecting, assessing, and evaluating the effects on and risks to human health from hazardous substances, as needed for Superfund removal and remedial cleanup decisions.

The EPA research program has been developed cooperatively within ORD and between ORD and OSWER. It has several components organized conceptually in a matrix. Three of these components correspond to the steps in the Public Health Evaluation Process used by the Office of Emergency and Remedial Response:

Toxicity Assessment

Key toxicity data will be developed for use in risk assessment, including rapid response toxicity testing and field screening of priority compounds, evaluation of the toxicity of incinerator and other treatment residues, evaluation of PCB and PCDF carcinogenicity, and human reproductive risks from chemical mixtures.

Exposure Assessment

To improve the confidence and accuracy of human exposure estimates at CERCLA sites, this research will characterize parameters needed for exposure assessment, validate existing models, and develop approaches for assessing multimedia exposure and integrating exposure assessment.

Risk Characterization

Methods for characterizing health risks and environmental effects of chemical mixtures will be developed and assistance will be provided in site assessment.

The other components correspond to major research themes of priority interest to ORD and OERR:

Internal Dosimetry

To better predict delivered dose, two areas of research will be emphasized:

1. *Pharmacokinetics*

This initiative will better predict the bioavailability of chemicals. Research will: define rates of skin, inhalation and oral absorption; characterize pharmacokinetic parameters of uptake, distribution, and metabolism; develop physiologically based pharmacokinetic models for multiple routes of exposure and for multiple compounds; and identify sensitive subpopulations.

2. *Biomarkers of Exposure and Effect*

This initiative will focus on methods for measuring dose through different biologic assays, including a variety of somatic (mutagenicity) and germinal markers (sperm measures) as well as the application of markers to epidemiologic methodologies to improve sensitivity and specificity for human disease endpoints.

Chemical Mixtures

Focus will be on developing toxicological models to predict interactions, identifying classes of contaminants that may yield additive, synergistic or antagonistic responses, and developing statistical methods for analyzing high-dimensional data sets.

Noncancer Health Effects

Reproductive toxicity is a critical endpoint of interest for OERR and will be the initial focus. Research will develop sensitive test methods for detecting effects on male and female reproductive systems, and biological markers as early indicators of exposure to chemical mixtures. Additional emphasis is being placed on neurotoxic endpoints with development of new and more sensitive *in vitro* and *in vivo* endpoints.

The research projects vary in length from two to five years. Annual progress reports or program reviews will be prepared for these projects.

8.3.2 Agency for Toxic Substances and Disease Registry Research and Development Program

The ATSDR research program focuses on assessing the relationship between exposure to toxic substances and resulting human health effects, and also on effective ways to inform the public of health risks.

Epidemiologic and Pilot Studies

An epidemiologic study is the evaluation of a specific hypothesis concerning the relationship between an exposure to a hazardous substance(s) and a health outcome in a defined population. All studies in FY87 were conducted by the Center for Environmental Health and Injury Control or by the National Institute for Occupational Safety and Health, of the Centers for Disease Control.

Fifteen epidemiological studies were conducted or in progress on dioxin, PCBs, lead, arsenic, volatile organic compounds, and other substances. Also, nine pilot studies, which are used to determine if a comprehensive epidemiological investigation is warranted, were completed in FY87, and five additional pilot studies are in progress.

Health Surveillance Systems

A health surveillance is the periodic medical screening of a defined population for a specific disease or biological markers of a disease, for which the population is at significantly increased risk. The surveillance system should include a mechanism to refer to for treatment of those individuals who screen positive for the disease.

State agencies operated four health surveillance systems in FY87 to determine the impact of hazardous substances in the environment on: (1) chronic diseases; (2) developmental disabilities; (3) low birthweight and adverse reproductive outcomes; and (4) tracking workers previously employed by the Drake Chemical Company plant in Lock Haven, Pennsylvania, for bladder cancer.

Toxicological Profiles and Testing Needs

CERCLA section 104(i)(2)(A) requires publication of a priority list of 100 hazardous substances found at NPL sites that pose significant human health risks. ATSDR and EPA published the list of the first 100 priority hazardous substances in a *Federal Register* notice (52 *FR* 12866) and proposed guidelines for developing the first 25 Toxicological Profiles, effectively meeting the April 17, 1987 deadline. On October 15, 1987, the agencies published 25 draft toxicological profiles for EPA and they are now undergoing public comment.

A toxicological profile involves an analysis of available toxicological and epidemiological data to determine health effects from exposure to a substance. The profile will determine if there are adequate data to set levels of exposure that cause health risks, and if not, will identify toxicological tests necessary to determine that level. EPA and the Hazardous Waste Information Evaluation Subcommittee of HHS nominated 50 chemicals and several chemical mixtures to the National Toxicology Program (NTP) for toxicological testing. The NTP initiated testing of the chemicals, using Superfund monies, to fill gaps in information about the health effects of the chemicals.

Human Exposure Assessment

To determine the baseline amount of soil that children normally ingest, a human exposure assessment study applied standard formulae to measurements of trace elements found in the stool specimens of small children. This study will support development of human exposure assessments, especially among children residing near sites that have contaminated soil.

Information Dissemination Research

ATSDR is developing, in collaboration with the National Library of Medicine, an artificial intelligence expert system for use in emergency response situations. The objective of the system is to provide assistance to emergency responders to verify, retrieve, and integrate information, to "reason" in some fashion, to make choices, and to build a precedent file of experiences. The system will also be used to facilitate training.

Clinical Toxicology

A wide range of clinical toxicological research was conducted in FY87 on both organic and inorganic toxicants, with specific programs to study the effects on genes, the liver, the immune system, and the kidney.

Health Education Research

During FY87, ATSDR supported research with the National Academy of Sciences, National Research Council, on environmental toxicology and environmental epidemiology, including a project on risk perception and communication.

8.4 Technical Assistance Provided in Fiscal Year 1987

8.4.1 Chemical Fate, Transport, and Ecological Effects

During FY87, ORD provided technical assistance to EPA Regional offices and the Environmental Response Team, including: (1) application of a bioassessment protocol to determine bioavailability of hazardous substances in site samples; (2) evaluation of the efficacy of various disposal scenarios for contaminated marine sediments; (3) evaluation of ground-water plume movement and biological stabilization of subsurface contaminants; (4) assessment of contaminant uptake by fish in the Great Lakes; and (5) assistance to other Federal agencies with waste problems at specific Federal facilities.

8.4.2 Site Risk Assessments

The Office of Research and Development provided assistance to EPA Regional offices and the Office of Waste Programs Enforcement on the assessment of exposure, health effects, and risks. ORD provided Endangerment Assessments on 20 sites. A group was established to provide review of risk assessments prepared by the EPA Regional offices and to serve as a focal point for obtaining risk assessment information.

8.4.3 Chemical Assessments

In FY87, ORD began work on 50 Health and Environmental Effects Documents; 15 were completed. ORD assisted ATSDR in preparing Toxicological Profiles. In addition, 12 rapid response health assessments on specific chemicals were provided for use in emergency situations. RQ documentation for carcinogenicity and other chronic health effects were prepared for 50 chemicals and wastes, in addition to draft RQ documentation for 191 suspected carcinogens on the original CERCLA hazardous substances list. Chronic toxicity profiles were prepared for 74 additional chemicals.

8.4.4 Engineering Reviews and Assistance

Engineering staff served on technical advisory committees, reviewed site assessment and feasibility plans, and advised on engineering issues. A report was completed on data requirements for remedial action technology screening, evaluation, design, and construction. In concert with several Regional offices, EPA developed engineering cost models that will improve cost estimates of remedial action alternatives. Regional offices were provided with engineering assistance for approximately 35 sites, including the feasibility of using mobile treatment systems for specific cleanups.

8.4.5 Monitoring Support

Monitoring technical support was provided to EPA Regions and the National Enforcement Investigation Center on more than 400 sites. Remote sensing, including topographic mapping and aerial imagery was used to locate old or buried contamination sources and to create topographic maps. Approximately 30 maps and 400 images were provided in FY87. Advice on the use of geophysical tools, such as resistivity, magnetometry, ground-penetrating radar, and other remote sensing devices, was provided in response to specific requests, as was assistance on the proper design and quality assurance for sampling protocols. Performance of the EPA Regional laboratories was evaluated through the use of reference materials and the review of laboratory data.

9.0 EPA AND AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY HEALTH-RELATED ACTIVITIES

9.1 Overview of the Health Assessment Program

To clearly delineate the nature of its activities, the Agency for Toxic Substances and Disease Registry has established the following definitions for three of its key functions:

- The ATSDR health assessment is the evaluation of data and information on the release of toxic substances into the environment in order to assess any current or future impact on public health, develop health advisories or other health recommendations, and identify studies or actions needed to evaluate and mitigate or prevent human health effects.

- The ATSDR health consultation is a response from ATSDR to a specific question or specific request for information about a toxic substance or a facility affected by a toxic substance. A health consultation is a more limited response by ATSDR than what is provided by a health assessment.

- The ATSDR health advisory is a communication from the ATSDR Administrator to the EPA Administrator that states ATSDR's concern that a public health threat exists that is of such importance and magnitude that EPA should intervene immediately. ATSDR issued no health advisories in FY87.

There are purposeful differences between ATSDR's health assessments and EPA's risk assessments. The former are usually qualitative and site-specific and focus on medical and public health perspectives. However, EPA risk assessments are quantitative and use statistical and biological models to calculate numerical estimates of current and potential risk to human health. EPA's risk assessments may also address environmental effects.

9.2 Progress in Fiscal Year 1987

In FY87, ATSDR established, as one of its primary goals, the use of health assessments to meet as many public health needs as possible. Toward this end, ATSDR began the following activities in FY87 and continued these activities through FY88:

- Reviewing health assessment data gathered through such means as exposure surveys, epidemiological studies, exposure registries, and health surveillance to determine the need for public health followup;

- Reviewing health assessment data to identify gaps in knowledge (e.g., toxicity information) to guide research efforts;

- Establishing closer working relationships with State and local agencies to obtain health-related data not previously supplied to ATSDR and to support State efforts in addressing the public health issues associated with toxic substances;

- Developing a computer-based information system to store and manage the health assessment data base; and
- Exploring the effectiveness of computer models and graphics in research related to health assessment activities.

Health Assessments

ATSDR published, in the *Federal Register*, procedures for requesting a health assessment. These procedures include minimum requirements for a petition. In addition, ATSDR and EPA jointly issued a procedural manual on conducting health assessments. The manual is designed to integrate health assessment provisions of CERCLA into the remedial program.

Health assessment-related accomplishments include:

- Sixty health assessments of NPL sites in 28 States;
- Forty-five health assessments of non-NPL sites in 21 States;
- One health assessment as a result of an individual's petition of ATSDR; and
- Cooperative agreements were awarded to Colorado, Florida, Iowa, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, South Carolina, and Wisconsin, to assist them in building capacity to perform health assessments.

Health Consultations

There were 1,467 health consultations completed in 50 States and in Puerto Rico, the Virgin Islands, the District of Columbia, American Samoa, Guam, the Trust Territory of the Pacific, the Marshall Islands, Palau, Ponape, Quebec, and Mexico.

10.0 IMPLEMENTATION OF THE FEDERAL FACILITIES REQUIREMENTS

10.1 Overview of the Federal Facilities Program

CERCLA section 120, added in its entirety by SARA, states that, with few exceptions, CERCLA provisions, guidelines, rules, regulations, and criteria apply to facilities owned and/or operated by the Federal government, just as they do to other facilities. To focus attention on these Federal facilities, and to implement the CERCLA requirements concerning them, EPA established the Federal Facilities Compliance Task Force in the Office of Waste Programs Enforcement (OWPE). The Task Force works with EPA Headquarters and Regional offices and States to resolve issues concerning Federal facilities. The goal of the Task Force is to establish a nationally consistent enforcement program that recognizes and encourages the full use of EPA and State enforcement tools to ensure that Federal facilities comply with CERCLA and RCRA requirements.

OSWER is also creating a division within OWPE to monitor compliance with environmental laws at Federal facilities. The division will focus on management of the Federal facilities docket, policy and guidance development, and compliance monitoring.

10.2 Federal Facilities Hazardous Waste Compliance Docket

CERCLA section 120(c) requires EPA to establish a Federal Facilities Hazardous Waste Compliance Docket. The purpose of the docket is three-fold:

- To identify Federal facilities that may be contaminated with hazardous substances;

- To compile and maintain information submitted to EPA on these facilities under the provisions of CERCLA section 120(c); and

- To provide a mechanism to make this information available to the public.

The initial docket was published in the *Federal Register* on February 12, 1988, and lists 1,094 Federal facilities; Exhibits 10.2-1 and 10.2-2 illustrate the numbers of facilities on the initial docket by Federal agency and by EPA Region, respectively. This docket, available for public inspection, will also contain notice of all actions taken under CERCLA regarding Federal hazardous waste facilities and all hazardous substance release notification information concerning Federal facilities submitted to EPA under CERCLA section 103 and under the permitting and activity notification provisions of RCRA sections 3005, 3010, and 3016.

EPA will also furnish information to the public regarding facilities on the docket. EPA has established information repositories in all 10 Regions. Each Region will collect the documents submitted by Federal facilities and organize and index them according to a uniform system. A milestone tracking system will be developed to indicate each facility's progress in complying with Superfund and RCRA requirements.

Exhibit 10.2-1

Federal Facilities Listed on the Initial Hazardous Waste Compliance Docket[1]

Department or Agency	Number of Facilities[2]	Percentage of Total[3]
Defense	574	54.3
Air Force	*118*	
Army	*235*	
U.S. Army Corps of Engineers	*15*	
Navy	*205*	
Other Defense Agencies	*21*	
Interior (including Bureau of Land Management)	254	23.2
Energy	45	4.1
Transportation	45	4.1
Agriculture	26	2.4
Health and Human Services	21	1.9
General Services Administration	20	1.8
National Aeronautics and Space Administration	16	1.5
Environmental Protection Agency	16	1.5
Tennessee Valley Authority	15	1.4
Veterans Administration	14	1.3
Postal Service	11	1.0
Commerce	11	1.0
Justice	2	0.2
Labor	2	0.2
Treasury	1	0.1
Central Intelligence Agency	1	0.1
Housing and Urban Development	1	0.1
Total	1,094	100.1

[1] 53 *FR* 4280, February 12, 1988.

[2] The numbers of facilities may vary in subsequent listings because further information may change a facility's status.

[3] Rounding causes percentages to total slightly more than 100.00 percent.

Exhibit 10.2-2

Distribution by Region of Federal Facilities on the Hazardous Waste Compliance Docket

Region	Number of Facilities	Percentage of Total*
1	50	4.6
2	98	8.9
3	127	11.6
4	127	11.6
5	89	8.1
6	98	8.9
7	32	2.9
8	74	6.8
9	240	21.9
10	159	14.5
Total	1,094	99.8

*Rounding causes percentages to total slightly less than 100.00 percent.

EPA's efforts in establishing the docket in coordination with the other Federal agencies and departments involved compiling data to produce the initial docket of Federal facilities and setting up repositories in EPA Regional offices to hold the collected information. Compiling and verifying the data required extensive coordination between EPA Headquarters, Regional offices, contractor staff, and other Federal agencies. EPA expects to publish an updated docket in the *Federal Register* every 6 months.

10.3 Federal Facility Preliminary Assessments/Site Investigations

Executive Order No. 12580 delegates the responsibility for conducting PAs and SIs at Federal facilities to the Federal agencies that own and/or operate those facilities. EPA has the responsibility to ensure that these activities are performed and has provided guidance and training and organized workshops for other Federal departments and agencies on conducting PA/SIs. To address CERCLA deadlines, EPA developed a strategy for pre-remedial activities that set an April 17, 1988, deadline for Federal agencies to submit to EPA a PA report on each of the facilities listed on the initial Federal facilities docket.

This initial assessment will help determine if a release has occurred or if there is a significant threat of a release, and whether the facility should be evaluated for inclusion on the NPL. Thus, the docket is not intended to serve as an NPL for Federal facilities. When the PA indicated that additional evaluation of the facility was necessary and the PA data was inadequate to support an HRS evaluation, EPA requested the responsible agency to provide, by

April 1988, all the information necessary to perform a full HRS evaluation of the site. EPA will propose such facilities for inclusion on the NPL if they meet the established criteria.

10.4 Federal Facilities Proposed for and Listed on the National Priorities List

On July 22, 1987, EPA added 32 Federal facility sites to the NPL (52 *FR* 27620), the first Federal facilities to be included on the list. One additional Federal facility was proposed for inclusion on the NPL, pending a complete review of comments and the resolution of technical and policy issues. Fourteen additional Federal facilities were proposed for the NPL on June 24, 1988; later in 1988 a proposal specifically for Federal facilities will be published.

10.5 Federal Real Property Transfer Regulations Under CERCLA Section 120(h)(1)

Anytime the Federal government sells real property at which a hazardous substance was released, disposed of, or stored for a year or more, the sales contract must include a notice that discloses the type and quantity of the hazardous substance and when it was on the property. Additionally, CERCLA section 120(h)(3) requires any Federal department or agency transferring federally owned real property to include in the deed a covenant assuring the transferee that all remedial action necessary to protect human health and the environment was taken before the transfer, and also that the Federal government will conduct any remedial action found to be necessary after the property is transferred.

Section 120 also requires EPA to promulgate regulations on the form and manner of the notice to be put in sales contracts and deeds. EPA proposed these regulations on January 13, 1988. Among the proposed rule's key provisions is the requirement that the contract notice contain the hazardous substance's name and Chemical Abstracts Service Registry Number, and the time and quantity of its storage, release, or disposal. The Agency will also propose that the transfer of some single-family residences acquired through foreclosure by government agencies such as the Federal Housing Administration and Veterans Administration be exempted from the notice requirement. Property at which less than 1,000 kilograms of hazardous substances were stored would also be exempt.

10.6 Interagency Agreements Under CERCLA Section 120(e)(2)

EPA, the Department of the Army, and the State of Minnesota signed the first interagency agreement (IAG) involving a Federal facility, the Twin Cities Army Ammunition Plant, on August 12, 1987. The final decision on the remedy to be undertaken at a Federal facility is made jointly by EPA and the responsible agency, unless there is disagreement, in which case, EPA has authority to make the decision unilaterally. Agreement on the selected remedy is outlined in an IAG between EPA and the responsible Federal agency.

EPA views an IAG as a comprehensive document that addresses all hazardous waste activities that will be conducted at a Federal facility, from the RI/FS through the implementation of the remedial action. IAGs formalize the procedure and timing for submittal and review of documents and establish a mechanism to resolve disputes. IAGs must comply with the public participation requirements of CERCLA section 117, and they are enforceable by citizens and States through citizens suits. Additionally, CERCLA authorizes assessment of civil penalties against Federal agencies for failure to comply with IAGs.

10.7 Report to Congress on EPA Responsibilities Under CERCLA Section 120(e)(5)

EPA has 14 facilities subject to section 120(e)(5) reporting requirements. This number differs from the number of EPA facilities listed in Exhibit 10.2-1 due to changes in facility status that occurred after the original *Federal Register* notice was published. These 14 facilities are identified in Exhibit 10.7-1. Section 120(e)(5) requires each Federal department, agency, and instrumentality to furnish an annual report to the Congress concerning its progress in implementing CERCLA at its facilities. The report must include information on: progress in reaching interagency agreements; cost estimates for each IAG; public comments on IAGs; progress in RI/FSs and RAs initiated at Federal facilities on the NPL; and progress in RAs at non-NPL facilities.

The Occupational Health and Safety staff of EPA's Office of Administration and Resources Management is working to prepare the report on these EPA facilities. At present, these facilities are undergoing PAs; consequently, there are no RI/FSs or other remedial actions to report as yet.

Exhibit 10.7-1

EPA Facilities on the Hazardous Waste Compliance Docket

Facility/Location	EPA ID #	Region
Narragansett Environmental Research Laboratory Narragansett, RI	RID 075721639	1
Environmental Services Division Laboratory Edison, NJ	NJD 1680090015	2
Environmental Photographic Interpretation Center Warrenton, VA		3
Environmental Services Division Laboratory Annapolis, MD		3
Environmental Research Facility Gulf Breeze, FL		4
Andrew W. Breidenback Environmental Research Center Cincinnati, OH	OH 2680030929	5
Center Hill Hazardous Waste Engineering Research Laboratory Cincinnati, OH	OH 1680090007	5
Environmental Services Division Laboratory Chicago, IL		5
Testing and Evaluation Facility Cincinnati, OH		5
Combustion Research Facility Jefferson, AR	AR 6140090006	6
Environmental Services Division Laboratory Kansas City, MO		7
EPA Mobil Incinerator Denny Farms, MO	MO 6680090010	7
National Enforcement Investigation Center Denver, CO	CO 1680090031	8
Environmental Services Division Laboratory Manchester, WA		10

11.0 MINORITY FIRM PARTICIPATION IN SUPERFUND CONTRACTING

The 1986 enactment of SARA added to CERCLA a new provision, section 105(f), that requires that the availability of minority businesses be considered in the Superfund work carried out under contract to the Federal government.

In the fulfillment of this mandate, EPA's Office of Small and Disadvantaged Business Utilization (OSDBU) has continued and expanded existing programs, begun new activities, and planned additional efforts to ensure the full and fair consideration of minority firms for Superfund contracting. EPA meets the remainder of its section 105(f) responsibilities by describing its minority contracting program activities and results in this Report.

11.1 EPA Procedures to Identify Qualified Minority Firms

EPA employs a wide variety of procedures to identify minority firms that may qualify for work as Superfund prime contractors or subcontractors. Contractors must meet standards of technical and financial ability in order to qualify for Superfund work. These procedures, which usually involve the assistance of minority business agencies at the Federal, State, and local level, are discussed below.

Memorandum of Understanding with the Minority Business Development Agency (MBDA)

One of the tools EPA can use in its implementation of the Superfund program is a Memorandum of Understanding (MOU). An MOU is a statement agreed to by two or more parties (in this case, EPA and another Federal agency) that recognizes the interrelationship of their two functions and specifies appropriate interactions between the two parties. EPA is negotiating an MOU with the MBDA, a unit of the U.S. Department of Commerce, to gain its assistance in identifying minority business enterprises (MBEs) that may be eligible for work in the Superfund program. Minority business development centers (MBDCs), which are private firms that assist the Federal government in its minority contracting efforts, will be particularly helpful in this effort. EPA envisions several ways to use MBDA regional offices and MBDCs to match minority and women's business enterprises (WBE) with specific Superfund direct procurement needs. For example, MBDCs can provide technical assistance needed by firms to help them qualify for Superfund contracting.

MBE Coordinators in EPA Regional Offices

EPA employs MBE Coordinators in each of its 10 Regional offices to act as liaisons between OSDBU and EPA Regional personnel, State and local officials, MBDA Regional offices, and MBDCs. Special efforts have been made to apprise MBE coordinators of the requirements for Superfund minority contracting and how they may assist EPA's Superfund program officials in complying with these requirements.

Survey of State and Local Governments

EPA has begun a survey of State and local governments to determine whether these governments have established goals or objectives for minority firm participation in government contracting. EPA will use the results of this survey, which is targeted for completion in FY88, to inform State and local government offices of the Superfund minority contracting program. In a related effort, EPA's Regional MBE Coordinators will solicit information on potential Superfund minority contractors from State governments in their Regions.

Small Business Administration (SBA) Section 8(a) Program

EPA's Socioeconomic Program Officer will work closely in FY88 with SBA officials to identify any Superfund contracting needs that may be fulfilled by minority contractors in the SBA section 8(a) program. The 8(a) program, which was established by section 8(a) of the Small Business Act, allows SBA to act as a prime contractor for Federal government contracts and set up subcontracts with small disadvantaged (minority) firms. The small disadvantaged firms compete for these subcontracts only against other such firms in the 8(a) program.

EPA Procurement History Files

EPA will undertake a comprehensive search of its Procurement History Files in FY88 to identify minority firms that have worked on Superfund projects in the past.

The MBDA PROFILE System

The MBDA maintains a computer-based compilation of data on approximately 31,000 minority firms known as the PROFILE System. The system classifies firms according to Standard Industrial Classification Code and Zip Code. Minority businesses listed in another data base, the SBA's Procurement Automated Source System (PASS), have been extracted from PASS and incorporated into the PROFILE System. EPA will undertake a search of the PROFILE system in FY88 to identify potential Superfund minority contractors.

11.2 EPA Efforts to Encourage Participation

Because Superfund contracting opportunities are not always well known, and because entry into a Superfund contract is voluntary, EPA must publicize the Superfund minority contracting program in the minority business community, and must encourage the participation of qualified firms. This subsection describes the various ways in which EPA brings qualified firms into the Superfund minority contracting program.

Minority Procurement Conferences

In a collaborative effort with EPA's Procurement and Contracts Management Division, OSDBU has sponsored several highly successful Minority Procurement Conferences in various locations throughout the country to help minority businesses participate more fully in the Agency's competitive procurement activities. Two of these Conferences were held in FY87; three are planned for FY88.

MBE/WBE Information Seminars

EPA and State governments co-fund State-run seminars to inform minority firms of EPA contracting opportunities. Three seminars (one each in Utah, Florida, and Washington) were held. In FY88, seminars have already been conducted in Mississippi and New England, and are scheduled for Oregon and New York.

OSDBU MBE/WBE Training Workshops

OSDBU conducts MBE/WBE Training Workshops for EPA Regional and State officials; workshops were held in four EPA Regions that involved 23 States and the District of Columbia. Workshops for the remaining six EPA Regions are scheduled for FY88. An Annual Workshop for OSDBU Regional MBE Coordinators is also held.

Minority Business Training

In FY88, EPA will assist the National Association of Minority Contractors (NAMC) in conducting training programs to prepare potentially qualified minority firms to compete more effectively for EPA and State prime contracts and subcontracts. Three weeks of training activities will be conducted in each of several major cities through a $500,000 contract awarded to NAMC by EPA on January 14, 1988.

MBDA National and Regional Conferences

MBDA, by agreement with EPA, conducts national and Regional conferences for MBDCs to encourage minority businesses to participate in the Superfund program. One national conference and one conference in each MBDA Region are conducted each year.

Letters to Other Federal Agencies Participating in the Superfund Program

OSDBU stressed the importance of minority contractors in October 1987 letters it sent to its counterpart OSDBU offices in other Federal agencies involved in the Superfund program, such as the Army Corps of Engineers. In order to help ensure that these other agencies comply with section 105(f), EPA has required them to submit regular, detailed reports on Superfund contracts they have awarded to minority firms.

Publications on Superfund Participation

EPA issued two publications on contractor participation in Superfund in FY87: "CERCLA: Getting into the Act," in April 1987, and "Doing Business with EPA," in August 1987.

11.3 Participation by Minority Firms in Superfund Contracting

The extent of minority Superfund contracting relative to all Superfund contracting is shown in Exhibit 11.3-1. As the table shows, minority contracting accounted for 6 percent of all Superfund contracting on a dollar value basis. The greatest dollar value of minority firm work on Superfund projects was obtained through direct procurement by EPA. The types of services that minority firms provided through direct procurement can be categorized into three major areas: professional, field support, and construction. Typical services contracted or subcontracted to these firms are listed below.

Professional

Health Assessment
Community Relations
Feasibility Studies
Data Management
Geophysical Surveys
Remedial Investigations
Expert Witness
Editing
Air Quality
Monitoring

Field Support

Drilling/Well Installation
Laboratory Analysis

Construction

Site Cleanup
Excavations
Waste Hauling Disposal
Security
Site Support Facilities

CERCLA cooperative agreements (CAs) are contract-type arrangements between EPA and State government agencies, local governments, and Indian Tribes that enable EPA to involve these non-Federal governments in response activities at Superfund sites within their jurisdiction. CAs specify work to be performed and the funding allocated for the work. Governments with CAs may establish more specific subagreements, some of which involve minority firms. In FY87, of the $9,400,000 awarded to non-Federal governments, $2,100,000 in subagreements, or 22 percent, were awarded to minority contractors. These awards ranged from a low of $350 to a high of $833,345. The services rendered under the subagreements were primarily professional services such as architectural and engineering work, and services related to remedial design for Superfund sites.

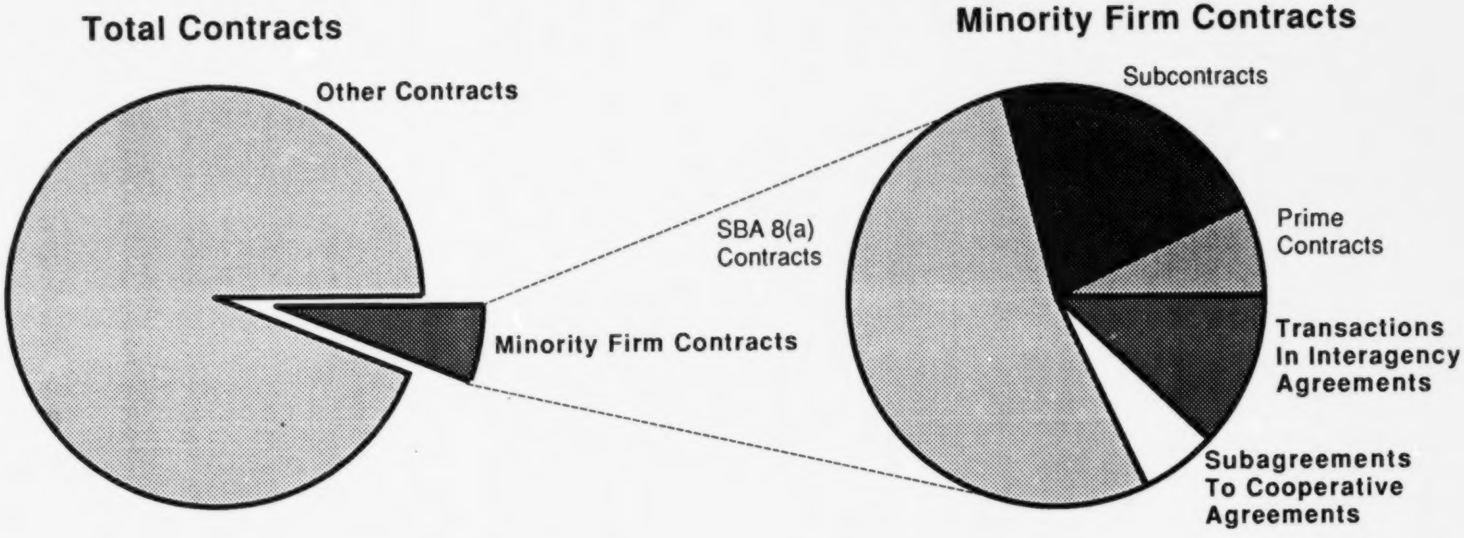
EPA interagency agreements are similar to cooperative agreements, except that the former are negotiated between EPA and other Federal agencies, such as the Army Corps of Engineers. These agencies then allocate specific portions of their interagency agreements to minority contractors and other contractors. Interagency transfers of Superfund monies during FY87 amounted to $237,500,000. Of this amount, $4,600,000 was placed with minority contractors. The range of minority awards was from $4,755 to $4,200,000. The services provided under these awards include conference support, automated data processing services, and services related to the study, design, and implementation of a site remedial action.

The total $38,000,000 of Superfund program minority firm contracting is diagrammed in Exhibit 11.3-1 by type: prime contracts; subcontracts; and SBA 8(a) contracts. As shown, 8(a) contracts account for the greatest amount of Superfund minority contracting, in terms of both the number of contracts awarded and the dollar value of the contracts.

The data for Exhibit 11.3-1 were obtained from a variety of sources. Direct procurement figures were obtained from the Federal government's Contract Information System (CIS). The total number of awards and the total dollars awarded through cooperative agreements were obtained through EPA's Grants Information Control System (GICS). The number of minority subagreements awarded and the dollar value of these subagreements were obtained by EPA Regional offices from Standard Form 334.

Exhibit 11.3-1

Minority Firm Share of Superfund Contracting by Type, Fiscal Year 1987



Contract Type	Number of Contracts		Value (millions of dollars)		Minority Firm Share of Total Value
	Total	Minority*	Total	Minority*	
Direct Procurement	3,004	241 (93%)	$357.0	$31.3(82%)	9%
Prime contracts		21		2.8	
Subcontracts		90		8.4	
SBA 8(a) contracts		130		20.1	
Cooperative agreements	66	14 (5%)	9.4	2.1(6%)	22%
Interagency agreements	265	6 (2%)	237.5	4.6(12%)	2%
Total	3,335	261	$603.9	$38.0	6%

*Percentages in parentheses indicate how total minority firm contracting is divided among the contract types.

The total number and dollar value of Interagency Agreements was obtained from the GICS. The minority contractors' share of these figures was obtained from the Federal agency making the award by the use of EPA Form 6005-3. Of the 20 Federal agencies contacted, only two, the Army Corps of Engineers and the Department of Health and Human Services, reported any use of minority contractors.

12.0 THE NATIONAL RESPONSE TEAM AND REGIONAL RESPONSE TEAMS

The National Response Team (NRT) and the Regional Response Teams (RRTs) execute Federal responsibilities in the preparation for and coordination of on-scene response operations. The NRT, consisting of representatives from 14 Federal agencies, is responsible for national coordination and planning of preparedness and response actions. Representatives from the same 14 agencies, as well as State designees, make up each of the 13 RRTs. The RRTs oversee regional preparedness planning prior to response and assist in the coordination and operations of response.

NRT and RRT Accomplishments in Fiscal Year 1987

The NRT promotes Federal preparedness through training coordination, technical assistance, information exchange, contingency planning, and by fostering cooperation between the public and private sectors. In particular, the NRT has assisted EPA with the development of the NCP in accordance with Executive Order 12580. The NRT helped draft Subpart B of the NCP and reviewed and commented upon the entire document. In another CERCLA-related area, the NRT provided the means for the FY89 Interagency Budget Task Force to distribute CERCLA funds to Executive departments and agencies. Also during FY87, the NRT established a standing RRT for the Pacific Oceania area.

Established by the NRT in FY87, the following committees have carried out elements of the NRT's mission:

- The **Management Committee** developed the FY88 NRT Workplan and prepared a procedures manual to streamline NRT operations;
- The **Preparedness Committee** assisted in the development and review of the Hazardous Materials Emergency Planning Guide (NRT-1);
- The **Training Committee** developed the NRT training strategy; and
- The **Computer Applications Committee** began development of a directory of Federal information resources and other computer-based tools to enhance preparedness for, prevention of, and response to chemical incidents.

RRTs

Regional Response Teams, in accordance with their FY87 workplans, conducted a variety of preparedness activities, such as simulated response exercises and training seminars. The RRTs also developed RRT FY88 preparedness workplans tailored to Regional needs. When requested by Federal on-scene coordinators during FY87 emergency responses, RRTs were activated to provide information and technical services.

13.0 EXECUTIVE BRANCH ESTIMATE OF RESOURCES NEEDED TO COMPLETE SUPERFUND IMPLEMENTATION

13.1 Introduction

CERCLA section 301(h)(1)(G) requires EPA to estimate the resources needed by the Federal government to complete Superfund implementation. The Agency interprets this requirement to mean the cost of completing CERCLA's implementation through the current authorization (FY91) and beyond. The preliminary estimate included in this chapter, however, only includes information up through 1989. Congress provided EPA with $3,964,000,000 in budget authority for the implementation of CERCLA, as amended, for the three year period, fiscal 1987 through 1989. The budget authority provided for each respective fiscal year is:

- FY 1987 - $1,411,000,000
- FY 1988 - $1,128,000,000
- FY 1989 - $1,425,000,000

The actual level of funds obligated in each fiscal year may be slightly less than the level of budget authority provided. Data on the resources needed beyond 1989 are in the early stages of development, as part of the 1990 budget, and thus cannot be included in this Report.

The resources estimate in this chapter is divided between resources needed by EPA and those needed by other Federal departments and agencies. It is based primarily upon the responsibilities and duties assigned to EPA and other Federal departments and agencies by Executive Order 12580, some general assumptions about the overall size and cost of the Superfund program, and data submitted to EPA by other Federal departments and agencies. This estimate includes assumptions about the size and scope of the Superfund program, the nature and number of response actions, participation by States and private parties, the increasing use of treatment technologies, and other factors. In the case of EPA, these assumptions relate to management of the workload already in the remedial pipeline.

In developing the resource estimate required by section 301(h)(1)(G), EPA considered several sources:

- EPA Superfund budgets for fiscal years 1987, 1988, and 1989, including budget requests from other Federal departments and agencies;

- Data that Federal departments and agencies submitted to EPA under an approved General Services Administration (GSA) interagency report control number (IRCN) issued on February 5, 1988 as required under the provisions of 41 CFR 201-45.6 (IRCN 0354 EPA -- Annual);

- The Federal Agency Hazardous Waste Compliance Docket developed under CERCLA section 120(c) and individual Federal department or agency Annual Reports to Congress on Federal Facilities Implementation required under section 120(e)(5);

- EPA's Report to Congress under CERCLA section 301(a)(1)(C), which is entitled *Extent of the Hazardous Release Problem and Future Funding Needs* (December 1984);
- EPA's Annual Report to the Office of Management and Budget (OMB) on Pollution Abatement Needs at Federal Installations, which is submitted under Executive Order 12088; and
- Various EPA information systems, primarily the financial management system (FMS).

Although these sources will be used for future Reports, the Agency also is working to identify data requirements, improve data quality, develop cost estimating methods, and collect additional information. Specifically, EPA is working to prepare a more complete estimate for the current authorization, in the out-years of 1990 and 1991, and the unfunded period beyond 1991 by conducting:

An RI/FS Cost Study

This detailed and comprehensive study is expected to provide information on completion periods, costs associated with various activities, cost relationships between NPL EPA-lead and State-lead actions, and other cost components. The study was completed in fiscal year 1988.

An Analysis of Superfund's Unfunded Liability

This long-term effort will be coordinated with the development of the 1990 budget. In conjunction with the proposal of the NCP and its policies affecting program direction and scope, EPA should be in a position by fiscal year 1989 to project a more complete implementation cost estimate.

EPA's ability to project the Federal resource requirement for CERCLA implementation will improve with the publication of the final NCP and more than two years of experience implementing CERCLA, as amended by SARA. Better coordination with other Federal departments and agencies and additional data on the implementation of the Federal Facilities requirement of section 120 will also help to improve the estimate.

13.2 EPA Estimate of Resources Necessary to Complete Superfund Implementation

In estimating the resource requirements of EPA to complete the implementation of CERCLA, the Agency typically focuses its projections on the costs of the remedial and removal programs in future years. These two response program areas are the major components of the Superfund program and account for the large majority of the Agency's Superfund expenditures. The estimates of the resource needs for these two program areas are projected for fiscal years 1988 and 1989.

Developing a complete and accurate estimate of the costs to EPA of completing Superfund implementation is dependent upon a number of factors, many of which could change in future years. Presently, the most important factors are:

- Changes in Superfund program policies and procedures due to the revised NCP, particularly the cleanup standards requirements of CERCLA section 121;
- Changes in the remedial program due to the revisions to the HRS required by CERCLA section 105;
- Changes in the character and size of the CERCLIS inventory and, as a consequence, the facilities that are added to the National Priorities List;
- The effects of the long time period required to identify, develop, select, and construct a remedy, particularly those using treatment technologies;
- The level of State Superfund program activity;
- The level of potentially responsible party participation in the program; and
- The nature of and demand for removal actions.

Superfund expenditures support EPA activities in three major categories: program support, site-related support, and direct site support. Over time, the distribution of resources among those functions will vary as the program matures, and with changes in policy, direction, and the inventory and character of sites. EPA's Superfund budget also supports other Federal department and agency activities funded from the Hazardous Substance Superfund.

Program Support

In FY87, this category accounted for approximately 12 percent of Superfund resources, and was used to support:

- Information management;
- Policy and planning;
- General administration;
- Training;
- Community assistance grants;
- Siting capacity grants;
- Office of the Inspector General; and
- Support for other Federal departments and agencies.

Program support resources are used in four principal areas: (1) general and financial administrative support (24 percent); (2) research and support for other Federal departments and agencies (25 percent); (3) information management, policy and planning activities (24 percent); and (4) siting and community assistance, EPA Office of the Inspector General support, and miscellaneous other activities (27 percent).

Site-Related Work

In FY87, this category accounted for approximately 7 percent of Superfund resources, and was used to support:

- National Response Team and Regional Response Team activities;
- Cost recovery action under CERCLA section 107;
- Health studies and research; and
- Criminal casework.

Site-related work resources are largely accounted for by NRT and RRT support (36 percent), and preliminary enforcement and cost recovery activities (41 percent). The remaining 23 percent supports research for program support, criminal casework, and other miscellaneous activities.

Direct Site Support

In FY87, this category accounted for approximately 81 percent of Superfund resources, and was used to support activities in two areas:

- **Direct Site Work**

  Removal actions;
  Remedial actions;
  Pre-remedial/site assessments; and
  Engineering and design studies.

- **Site Support**

  Extended remedial actions;
  Community relations;
  Contract laboratory support;
  Contract management;
  Enforcement;
  Potentially responsible party settlements; and
  Superfund Innovative Technology Evaluation (SITE) program.

The bulk of these resources, approximately 77 percent, is devoted to removal and remedial actions, including extended remedial actions.

Any improvements which are made in developing a preliminary estimate of EPA's Superfund implementation resource needs will depend, to a large degree, on changes involving remedial program costs, cost recovery revenues, and direct cleanup actions taken by potentially responsible parties.

Potentially responsible parties contribute to the hazardous waste cleanup effort by undertaking and financing voluntary or enforced remedial activities, thereby reducing the number of remedial actions requiring government funding.

EPA is currently developing and implementing policies designed to encourage PRP cleanups.

13.2.1 Remedial Program Costs

Remedial actions are currently the single largest category of Superfund expenditures and are expected to remain so in the future. In order to project EPA funding needs for the remedial program, several key factors must be estimated:

- The projected size of the NPL;
- The projected number of RI/FSs, remedial designs, and remedial actions undertaken;
- The average cost of an RI/FS, RD, and RA; and
- The direct cleanup actions taken by responsible parties.

Exhibits 13.2-1 and 13.2-2 present data on EPA Superfund resource requirements in workyears and dollars, respectively. Summary data on the principal elements of EPA's Superfund workload are presented in Exhibit 13.2-3. Exhibit 13.2-4 presents an estimate of the EPA Superfund interagency funding requirements, by fiscal year.

Exhibit 13.2-1

EPA Superfund Staffing Requirements by Fiscal Year

(full-time equivalent workyears)

Program Area[1]	1987 Actual	1988 Current Estimate	1989 Budget Request
Hazardous Substance			
Research	93.4	85.6	102.8
Response	963.4	1,100.1	1,240.9
Enforcement	764.5	965.9	917.5
Management and Support	353.0	481.4	488.8
Total	2,174.3	2,633.0	2,750.0

[1] See section 5.4 for more information on the content of these EPA program areas.

Exhibit 13.2-2

EPA Superfund Funding Requirements by Fiscal Year

(dollars in thousands)

Program Area	1987 Actual	1988 Operating Plan	1989 Budget Request	1987-1989 Total
Program Support	$126,089.9	$194,840.8	$247,340.9	$568,271.6
Site Related Work	73,552.4	111,761.7	92,389.3	277,703.4
Direct Site Work/ Support	851,106.6	1,292,897.3	1,085,269.8	3,229,273.7
Site Work	655,352.1	951,349.1	695,653.4	2,302,354.6
Removal Actions	*122,061.0*	*121,742.0*	*124,792.0*	*368,595.0*
Pre-Remedial Work	*36,341.0*	*60,115.0*	*58,043.0*	*154,499.0*
Engineering & Design Studies	*205,344.1*	*217,594.0*	*171,350.0*	*594,288.1*
Remedial Actions[1]	*205,398.3*	*514,205.6*	*298,253.0*	*1,017,856.9*
Other	*86,207.7*	*37,692.5*	*43,215.4*	*167,115.6*
Site Support	195,754.5	341,548.2	389,616.4	926,919.1
Total Superfund[2]	$1,050,748.9	$1,599,499.8	$1,425,000.0[2]	$4,075,248.7

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[1] The FY 1989 budget request assumed $100,000,000 carryover funding to be used for RAs, bringing the total request to $1,525,000,000 and remedial action figures to $398,253,000.

[2] Includes funds transferred to other Federal departments and agencies from the Hazardous Substance Superfund appropriation (Trust Fund) via (1) the Superfund Interagency Budget (see Exhibit 13.2-4), and (2) site-specific interagency agreements (IAGs). The costs shown here for remedial activities include first starts, subsequent starts, and work-in-progress. In setting mandatory schedules, e.g., that for remedial actions, Congress focused on first starts only (see CERCLA section 116(e)). On average, program support activities are 14% of resources, site related activities are 7%, and site work and support activities account for the balance of 79%.

Exhibit 13.2-3

Summary Of EPA Superfund Workload by Fiscal Year[1]

Activity[2]	1987	1988 Estimate	1989 Estimate
Removal Actions	304	190	190
Pre-Remedial Actions			
PA Completions[3]	4,001	2,432	2,500
SI Completions	1,343	1,223	1,325
NPL Sites[4]	64	296	125
Remedial Sites[5]			
RI/FS Starts[6]	123	105	115
RD Starts	76	134	106
RA			
Starts	41	68	76
Final/Completions[7]	8	8	22

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[1] The workload data shown are for Trust Fund-financed actions and those undertaken by potentially responsible parties at NPL facilities/sites only. The numbers shown are by year and are not cumulative.

[2] The Agency expects to meet, or has met, the goals and mandatory schedules set out in CERCLA sections 105, 116, and 120, except for site inspections (SIs).

[3] EPA met the statutory goal for preliminary assessment (PA) completions during fiscal year 1987: to complete a PA for each site in the CERCLIS inventory without a PA by January 1988.

[4] Facilities/sites proposed for final listing on the NPL.

[5] Data are for first starts only; subsequent starts are not included, although they account for a significant part of the workload.

[6] EPA also expects to satisfy the statutory RI/FS schedule: to start 275 RI/FSs by October 17, 1989.

[7] Data are for completion of all construction work at sites.

Exhibit 13.2-4

EPA Superfund Interagency Funding by Fiscal Year[1]

(dollars in thousands)

Federal Department or Agency	1987 Actual	1988 Operating Plan	1989 Budget Request
Health and Human Services	$32,439.3	$71,915.0	$58,915.0
ATSDR	*32,439.3*	*43,000.0*	*43,000.0*
NIEHS[2]	--	*28,915.0*	*15,915.0*
Justice	10,918.6	16,373.0	16,700.0
Transportation USCG	4,023.3	4,948.2	4,948.2
Commerce NOAA	1,819.9	2,280.1	2,280.1
Federal Emergency Management Agency	1,173.7	1,969.6	1,879.6
Interior	687.0	1,253.6	1,253.5
Labor OSHA	281.3	1,008.2	1,008.2
Interagency Subtotal	$51,343.1	$99,747.7	$86,984.6
Trust Fund Total[3]	$1,050,748.9	$1,599,499.8	$1,425,000.0[4]

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[1] The resources shown here are those transferred to other Federal departments and agencies via the EPA Superfund Interagency Budget only. In addition to these resources, in fiscal 1987 only, approximately $14,804,900 was also transferred to other Federal departments and agencies via site-specific interagency agreements (IAGs) for support to EPA at Superfund sites. These two sources provided a total of approximately $66,148,000 or 6 percent of the total obligated Trust Fund amount of $1,050,749,000.

All funding for SARA Title III activities came from the Hazardous Substance Trust Fund and is included in the $14,804,900 EPA obligated for site-specific IAGs. Resources transferred from the Hazardous Substance Superfund to other Federal departments and agencies are presented solely in dollars and not workyears, although some of these funds may be used to develop personnel positions for CERCLA activities and support.

[2] NIEHS obligated $13,000,000 in fiscal 1987 against its reimbursable authority but did not report its obligations to EPA until 1988. EPA obligated $13,000,000 in fiscal 1988 to reimburse NIEHS for its fiscal 1987 costs.

[3] Trust Fund total includes Superfund interagency funding.

[4] FY 1989 total does not include anticipated $100,000,000 carryover from previous year nor does it reflect Congressional reduction in budget requests.

13.2.2 Cost Recovery Revenues

In addition to the direct remedial and removal actions that are undertaken by PRPs, a portion of the costs of certain Fund-financed response actions will be recovered from PRPs through enforcement activities. The cost recovery revenues obtained from PRPs will ultimately reduce the overall costs of both the remedial and removal programs. In general, it takes about three years from the time EPA makes an expenditure from the Trust Fund for final site work to the time these response costs are reimbursed to EPA by PRPs.

The cost recovery rate for remedial expenditures is subject to a range of possible estimates given varying assumptions about: (1) the probability of successful litigation; (2) the ability to recover interest costs from litigation; (3) how many NPL sites will be cleaned up by private parties without the use of the Fund; and (4) the role of new CERCLA settlement provisions, such as mixed funding and *de minimis* settlements. To date, Fund-financed remedial action generally has been taken at sites where PRPs are potentially capable of taking on cleanup responsibility. The cost recovery rate for these sites is likely to be relatively high.

In future years, as the rate of successful EPA enforcement actions increases, more PRPs are expected to undertake actual cleanups directly. As a result, more Fund-financed actions may be taken at sites where there are fewer financially-viable PRPs connected with the sites. The probability of cost recovery for these sites may be lower than for previous sites.

While the cost recovery revenues obtained from PRPs will reduce the costs of the two response programs to EPA, the available data for these revenues are not sufficient to allow for an accurate estimate of the percentage of Fund-financed remedial and removal costs that will be recovered from PRPs. The Agency is putting significant effort into improving its cost recovery performance. The fiscal 1987 cost recovery amount was the highest in the program's history.

13.3 Other Executive Branch Department and Agency Estimates of Resources Necessary to Complete Superfund Implementation

The second element in fulfilling the CERCLA section 301(h)(1)(G) requirement for this Report is to estimate the resources needed by other Federal departments and agencies. EPA requested the resource requirement information from the other Federal departments and agencies under an approved GSA interagency report control number issued on February 5, 1988, as required under the provisions of 41 CFR 201-45.6. Although EPA received fairly detailed information for fiscal 1987, EPA anticipates collection of more comprehensive information for the fiscal 1988 Report.

The resource needs of the other Executive branch departments and agencies for Superfund implementation activities are met through two sources:

- Hazardous Substance Superfund (Trust Fund)

Interagency Budget: These funds are transferred to other departments and agencies by EPA from the Hazardous Substance Superfund through an interagency budget under Executive Order 12580.

Site-Specific Agreements: These funds are transferred to other departments and agencies from the Hazardous Substance Superfund by EPA through site-specific agreements.

- Individual Federal Department or Agency Budgets

CERCLA-Specific Funds: These funds are budgeted by the individual departments or agencies specifically for CERCLA activities and support as part of the President's annual budget submission.

General Funds: These funds are utilized for CERCLA activities and support by other departments or agencies and are obtained from general budget resources or are taken from resources designated for other programs.

The reported resource needs of other Federal departments and agencies are summarized in Exhibit 13.3-1. Exhibits 13.3-2 and 13.3-3 present estimates of CERCLA implementation resource requirements from other Federal department and agency budgets in dollars and workyears, respectively. Information provided by other departments and agencies to supplement those numbers is included below.

Department of Defense

Since 1984, there has been an increased emphasis on this Department's efforts to clean up contamination from hazardous waste sites under the Defense Environmental Restoration Program. As a sub-element of the Defense Environmental Restoration Program, the Installation Restoration Program's objective is the cleanup of contamination from past activities in accordance with the procedures and requirements of the NCP. The preliminary studies and remedial investigations that have been performed for sites in the past few years under this program are now leading to the identification of needed response work.

The Department of Defense estimates the total cost of the Installation Restoration Program work to be between $11,000,000,000 and $14,000,000,000. The uncertainty in the total funding requirement for this program exists because there are still many remedial investigations to be completed and many agreements have not yet been signed with EPA and State agencies.

Department of the Interior

The Fund appropriation under general IAGs for DOI activities will enable the nine DOI bureaus to participate more effectively on the National Response Team and will be used for development of State and local contingency plans and development of procedures for natural resource damage assessments.

Exhibit 13.3-1

Annual Superfund Resource Needs of Other Federal Departments and Agencies As Reported Under GSA IRCN 0354 EPA

(dollars in thousands/full-time equivalent workyears)

Federal Department or Agency	Fiscal Year 1987 (Dollars)	1987 (FTE)	1988 (Dollars)	1988 (FTE)	1989 (Dollars)	1989 (FTE)	Total 1987-1989 (Dollars)	Total 1987-1989 (FTE)
Defense	$375,900	na	$402,800	na	$436,100	na	$1,214,800	na
Interior	7,810	71	12,700	79	87,100	101	107,610	251
Energy	38,962.6	ns	180,506.1	ns	128,802	ns	348,270.7	ns
Transportation	11,573	168.5	13,871	171.5	14,537	173.5	39,981	513.5
Health and Human Services	32,439.3	ns	71,915	ns	58,915	ns	163,269.3	ns
General Services Administration	150	0.3	261	4	1,575	19	1,986	23.3
NASA	0	0	23,900	0	25,000	0	48,900	0
Tennessee Valley Authority	200	0	0	0	0	0	200	0
Veterans Admin.	0	0	0	0	5,000	0	5,000	0
Commerce (NOAA)	2,417	14.4	2,868	19.7	3,359	21.6	8,644	55.7
Federal Emergency Management Agency	8,742	40	7,939	52	9,959	61	26,640	153
Total	$478,193.9	294.2	$716,760.1	326.2	$770,347.0	376.1	$1,965,301.0	996.5

na=not applicable; ns=not submitted

Funding figures may contain both Trust Fund and individual department/agency amounts (see Exhibits 13.2-4 and 13.3-2); FTEs relate only to individual department/agency resources.

Exhibit 13.3-2

Federal Superfund Implementation Funding Requirements by Fiscal Year

(dollars in thousands)

Federal Department or Agency[1]	1987 Actual	1988 Planned	1989 Budget Request
Defense[2]	$375,900	$402,800	$436,100
Interior	6,900	9,600	24,700
Energy	38,963	180,506	128,802
Transportation	6,615	7,803	8,639
General Services Administration	150	261	1,575
National Air and Space Administration[3]	--	23,900	26,000
Tennessee Valley Authority	200	--	--
Veterans Administration	--	--	5,000
Commerce	557	587	616
Federal Emergency Management Agency	1,522	--	--

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[1] Data shown for departments and agencies are for funds budgeted independently by these departments and agencies, and exclude resources from the Hazardous Substance Superfund. Also see Exhibit 13.2-4 for specific information on resources received by these departments and agencies from the Hazardous Substance Superfund via the EPA Superfund budget/appropriation. Data were not available from the Departments of Labor, Justice, and Health and Human Services.

[2] The numbers provided by the Department of Defense are for its Environmental Restoration Program. Only a portion of this program, the Installation Restoration Program, is directed towards Superfund-type cleanup, the total cost of which is expected to be in the range of $11-14,000,000,000.

[3] Estimate of resources needed to fully implement NASA's environmental compliance and restoration program. A portion of the facilities being addressed by this program are Superfund cleanup sites, but NASA data do not distinguish these resources.

Exhibit 13.3-3

Federal Superfund Implementation Staffing Requirements by Fiscal Year

(full-time equivalent workyears)

Federal Department or Agency	1987 Actual	1988 Planned	1989 Budget Request
Interior	71.0	79.0	101.0
Transportation	168.5	171.5	173.5
General Services Administration	0.3	4.0	19.0
Commerce	14.4	19.7	21.6
Federal Emergency Management Agency	40.0	52.0	61.0

Note: Data were not available from the Departments of Defense, Labor, Energy, Justice, Health and Human services, NASA, TVA, and VA.

Department of Transportation

The Fund appropriation through general IAGs will enable the USCG to maintain its response capabilities, ensure that CERCLA financial responsibility requirements are met, train emergency response personnel using program modules and simulation drills, staff the CERCLA component of the NRC, and maintain chemical information systems and records of characteristics for certain chemicals.

The Department of Transportation estimates that it will use 1988 funding from its department budget for the USCG and the Research and Special Programs Administration to completely fulfill their Superfund responsibilities. This will include Superfund cleanup projects at USCG and Federal Aviation Administration (FAA) facilities as well as third party liability costs as a result of the involvement of the Maritime Administration as a *de minimis* potentially responsible party at a nuclear waste site in Maxey Flats, Kentucky. In addition, DOT projects that it will require funding for third party liability costs from 1989, and perhaps beyond, resulting from the Maritime Administration's involvement at the Maxey Flats site.

General Services Administration

Within the 1988 budget request estimate, GSA proposed allocating $100,000 for one Superfund project at its facilities. In addition, GSA is currently involved in five Superfund site investigations in which it is a PRP. As a result, GSA estimates that it will incur third-party PRP costs in future years.

Department of Commerce

General IAG monies will allow NOAA to provide and evaluate updated field monitoring methods for sampling and analyzing contaminants discharged into marine environments; develop computerized contingency plans for selected ports; provide updated protective equipment; and participate on Regional Response Teams. The resource estimates do not include resources necessary to meet NOAA's role as a Federal trustee for natural resources.

Department of Justice

The FY88 resources for the Department of Justice under general IAGs represent an increase from 1987 for an expanded Superfund caseload and the operation of a system that provides automated data support for complex cases.

Department of Labor

Funds appropriated under general IAGs will allow OSHA to continue to provide EPA and other response personnel with technical assistance in protecting workers at Superfund sites, implementing the worker safety program at Superfund sites, and supporting the National and Regional Response Teams.

Federal Emergency Management Agency

Funds appropriated under general IAGs for FEMA's ongoing activities will enhance State, local, and Federal emergency preparedness and administrative support. These funds will be used for FEMA's support of the Regional Response Teams and will provide management support and oversight for temporary and permanent relocations. Funding for temporary or permanent relocation activities will be provided from resources under EPA's Hazardous Substance Response program.

14.0 OTHER EPA ACTIONS TO IMPLEMENT CERCLA

EPA undertook several actions to implement provisions added to CERCLA by SARA to address particular issues.

14.1 Implementation of CERCLA on Indian Lands

Section 207(e) of SARA amended CERCLA to add a new section 126 on Indian Tribes. In accordance with the mandate that EPA treat Indian Tribes as States, the Agency is planning to award cooperative agreements to Tribes so that they may conduct response actions. EPA is developing an administrative regulation that will establish the requirements Indian Tribes must satisfy in conducting response actions with EPA funds.

Study of Hazardous Waste Sites on Indian Lands

Section 126(c) requires the President to "conduct a survey, in consultation with the Indian Tribes, to determine the extent of hazardous waste sites on Indian lands. Such survey shall be included within a report which shall make recommendations on the program needs of Tribes under this Act, with particular emphasis on how Tribal participation in the administration of such programs can be maximized. Such report shall be submitted to Congress along with the President's budget request for fiscal year 1988." EPA submitted this Report to Congress on November 6, 1987.

The Report is based largely on data from an EPA-funded survey completed in July 1985 by the Council of Energy Resource Tribes (CERT) in consultation with Indian Tribes. The CERT survey was limited in scope and extended only to a sample of Indian lands. Because of the brief time between the enactment of SARA in October 1986 and the date in early 1987 by which submittal of this Report was required, EPA did not feel it was possible to conduct a comprehensive survey of hazardous waste sites on Indian lands.

The Report: (1) provides background on the Superfund program and explains the special status accorded Indian lands under the Federal system; (2) describes the approach and data sources used for the report; (3) presents findings from these data sources on the extent of the hazardous waste site problem on Indian lands; and (4) presents recommendations on program needs of Indian Tribes and the Agency's commitments to address those needs. A brief summary of the Report's findings and recommendations follows.

An EPA-funded survey that CERT completed in 1985, in consultation with Indian Tribes, included 1,196 reports of potential hazardous waste generators and sites on or near 25 selected Indian reservations. This sample represents about 10 percent of the 278 Federal Indian reservations. Data from supplemental sources, including discussions with Tribal representatives and the Department of the Interior's Bureau of Indian Affairs, confirm that there are potential hazardous waste sites on Indian lands in need of investigation.

Analysis of the data suggests, however, that the number of potential sites requiring investigation on the 25 reservations is significantly lower than the 1,196 reports in the CERT survey. Over half of the reports (645) are derived from an EPA data base of active hazardous waste generators and waste management facilities. In addition, sites near but not on reservation land were included in the survey. EPA's inventory of potential hazardous waste sites due for assessment under the Superfund program already includes many (467) of the reports in the CERT data base.

Based on these findings, the following recommendations were offered:

- EPA will conduct preliminary assessments and, if necessary, site inspections of potential hazardous waste sites on Indian lands using the Agency's Superfund program resources, unless a Tribe is willing and able to conduct the assessments;
- EPA will rely on its own response infrastructure to plan and conduct response actions wherever needed on Indian lands; and
- Through education and outreach programs, EPA will heighten Tribal understanding and awareness of hazardous waste site problems and provide information on Tribal participation in the Superfund program.

14.2 Love Canal: Habitability and Land Use Study

Section 312(e) of CERCLA requires the Administrator to conduct a study to:

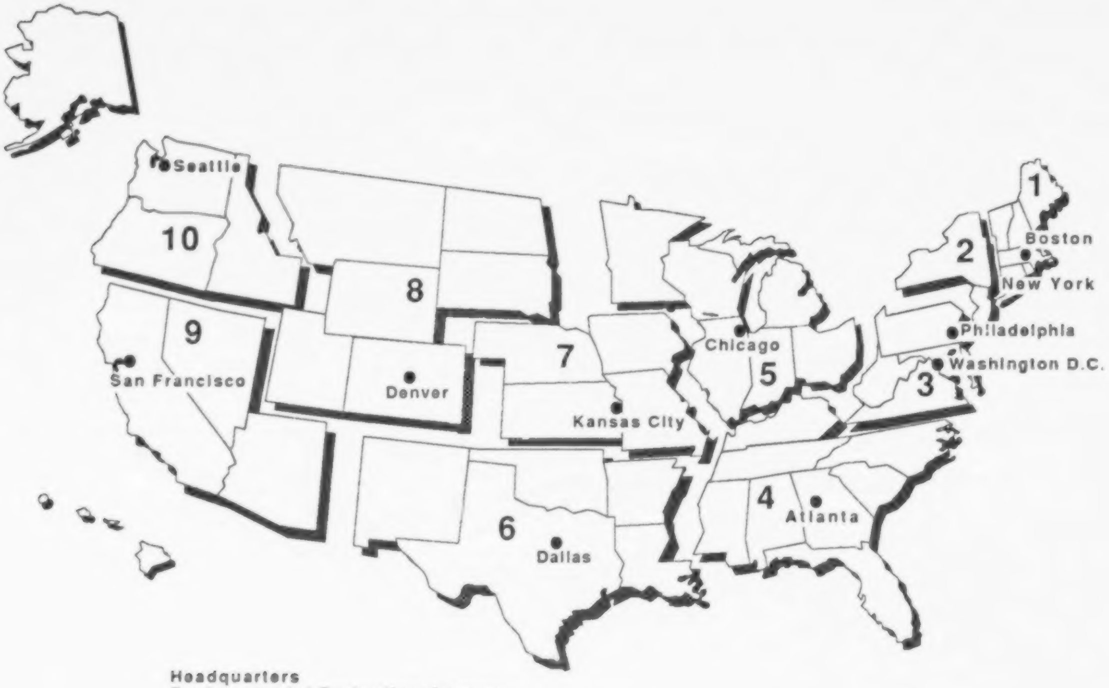
- Assess the risks associated with inhabiting the Love Canal Emergency Declaration Area (EDA);
- Compare the level of hazardous waste contamination in the EDA to that present in other comparable communities; and
- Assess the potential uses of the land within the EDA, including but not limited to residential, industrial, commercial, and recreational uses, and the risks associated with such potential uses.

As early as November 1983, the New York State Department of Health (DOH) and the U.S. Department of Health and Human Services, Centers for Disease Control (CDC), as members of the Love Canal Technical Review Committee, were asked to develop habitability criteria applicable to the EDA. To assist in developing such criteria, DOH and CDC sought the opinions and recommendations of 10 distinguished scientists representing a variety of disciplines.

After evaluating several approaches to determine habitability of the EDA, the scientific advisors recommended using a combination of relevant Federal and New York standards, criteria, or guidelines, and comparing levels of Love Canal indicator chemicals from EDA neighborhoods with levels of these chemicals from similar neighborhoods that are not near a chemical landfill. The views and opinions of these advisors were considered in a document prepared by CDC and DOH entitled *Proposed Habitability Criteria for the Love Canal Emergency Declaration Area*.

A comprehensive sampling program is the next step that will be carried out as part of the full-scale habitability and land use study; the results will help determine the habitability of the EDA. In addition, the results will be provided to and discussed with individual homeowners as soon as they become available; and further investigation will be undertaken, if necessary.

EPA Headquarters and Regional Superfund Offices



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APPENDIX A

STATUTORY LANGUAGE FOR THIS REPORT AND EPA AND EXECUTIVE BRANCH IMPLEMENTATION OF CERCLA AS AMENDED BY SARA

CERCLA Section 301(h) REPORT AND OVERSIGHT REQUIREMENTS.

(1) ANNUAL REPORT BY EPA. On January 1 of each year the Administrator of the Environmental Protection Agency shall submit an annual report to Congress of such Agency on the progress achieved in implementing this Act during the preceding fiscal year. In addition, such report shall specifically include each of the following:

(A) A detailed description of each feasibility study carried out at a facility under title I of this Act.

(B) The status and estimated date of completion of each such study.

(C) Notice of each such study which will not meet a previously published schedule for completion and the new estimated date for completion.

(D) An evaluation of newly developed feasible and achievable permanent treatment technologies.

(E) Progress made in reducing the number of facilities subject to review under section 121(c).

(F) A report on the status of all remedial and enforcement actions undertaken during the prior fiscal year, including a comparison to remedial and enforcement actions undertaken in prior fiscal years.

(G) An estimate of the amount of resources, including the number of work years or personnel, which would be necessary for each department, agency, or instrumentality which is carrying out any activities of this Act to complete the implementation of all duties vested in the department, agency, or instrumentality under this Act.

(2) REVIEW BY INSPECTOR GENERAL. Consistent with the authorities of the Inspector General Act of 1978 the Inspector General of the Environmental Protection Agency shall review any report submitted under paragraph (1) related to EPA's activities for reasonableness and accuracy and submit to Congress, as a part of such report a report on the results of such review.

(3) CONGRESSIONAL OVERSIGHT. After receiving the reports under paragraphs (1) and (2) of this subsection in any calendar year, the appropriate authorizing committees of Congress shall conduct oversight hearings to ensure that this Act is being implemented according to the purposes of this Act and congressional intent in enacting this Act.

CERCLA Section 105 NATIONAL CONTINGENCY PLAN

(f) Minority Contractors. In awarding contracts under this Act, the President shall consider the availability of qualified minority firms. The President shall describe, as part of any annual report submitted to the Congress under this Act, the participation of minority firms in contracts carried out under this Act. Such report shall contain a brief description of the contracts which have been awarded to minority firms under this Act and of the efforts made by the President to encourage the participation of such firms in programs carried out under this Act.

CERCLA Section 121(c) REVIEW

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each 5 years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section 104 or 106, the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

EPA AND EXECUTIVE BRANCH IMPLEMENTATION OF CERCLA AS AMENDED BY SARA

The Superfund Amendments and Reauthorization Act of 1986 (SARA) was passed by the Senate and House of Representatives on October 3 and 8, 1986, respectively, and signed by the President on October 17, 1986.

Section 115 of CERCLA authorizes the President to delegate authorities for executing the Act. In response to the SARA amendments to CERCLA, the President issued Executive Order 12580 on January 23, 1987, delegating authorities and assigning duties to various executive departments and agencies. Primary authority and responsibility for carrying out the Superfund program was assigned to the Administrator of EPA.

Other organizations, departments, and agencies received specific authorities in the Order, e.g., the National Response Team (NRT) plays a role in revision of the National Contingency Plan (NCP) and other specified regulatory and response activities, the Coast Guard generally oversees response in the coastal zone, Great Lakes, ports and harbors; and the Agency for Toxic Substances and Disease Registry (ATSDR) performs various health assessment functions. Executive Order 12580 also revoked the previous Order, No. 12316 of 1981, which had delegated authorities vested in the President by the original Superfund legislation of 1980.

EPA Organization and Operations for CERCLA Implementation

The Administrator signed final internal EPA delegations of authority on December 11, 1986, and on August 14, and September 13 and 21, 1987.

Following delegation from the President, the EPA Administrator may retain all authorities assigned to him; ordinarily, however, he delegates many specific Superfund authorities and responsibilities to the program offices of EPA. Generally, the Administrator delegates authority to senior management officials that report directly to the Administrator.

The Administrator assigns most responsibilities for carrying out specific CERCLA provisions to EPA Regional Administrators and to the Assistant Administrator for the Office of Solid Waste and Emergency Response (OSWER). A wide variety of other EPA offices also play roles in CERCLA implementation. These other offices include the Office of Enforcement and Compliance Monitoring (OECM), the Office of Research and Development (ORD), and the Office of Solid Waste (OSW). Each internal delegation indicates whether or not the authority for executing a Superfund provision may be redelegated. If authority is redelegated, the original delegatee remains accountable to the Administrator for exercising the authority.

Two program offices work within OSWER to administer the major activities of CERCLA. OWPE executes the enforcement-related activities of Superfund through its CERCLA Enforcement Division. OERR is responsible for administering the Superfund response program.

EPA Interagency Agreements and Memoranda of Understanding with Other Federal Agencies

In coordinating CERCLA's implementation, EPA occasionally exchanges goods and services with other Federal agencies and with State governments. Such exchanges are governed by interagency agreements (IAGs).* The IAG is a written agreement designed to carry out a distinct project whose objective is clearly defined. All activities under an IAG must serve the objective through the term of the project. EPA undertook an initiative to promote consistent use of IAGs and to improve accounting and cost documentation practices. A draft manual entitled *Regional Processing of Superfund IAGs* was distributed in July 1987.

EPA IAGs may be divided into two major classes. The first class is characterized by an exchange of goods or services for monetary reimbursement, or a sharing of goods and services between two parties. The second class is characterized by a policy agreement or Memorandum of Understanding (MOU). The MOU sets forth the policies and procedures governing the relationship of two parties, or it governs the provision of services without monetary reimbursement. No funds are exchanged under an MOU.

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*Agreements between EPA and States governed by a Superfund Memorandum of Agreement focus on environmental problems, objectives, and points of coordination. Such agreements are not considered IAGs.

APPENDIX B

FISCAL 1987 REMOVAL ACTIONS

Removal actions vary greatly in length and are undertaken on a continuous basis throughout the year. Consequently, the table shows many FY87 starts that will be completed in future fiscal years. In addition, some completions noted are for starts in prior fiscal years. Start dates signify the first day that the ERCs contractor is onsite. The completion date marks the day that all waste is at its ultimate disposal location. See section 2.2 of this Report for a summary of removal actions by State and Region.

FISCAL 1987 REMOVALS

	Site	Location	Start Date	Completion Date
REGION 1				
Connecticut	Connecticut River Drum	Rocky Hill	06/24/87	06/26/87
	Linemaster Swith Corp.	Woodstock	--	09/24/87
	*Laurel Park, Inc.	Naugatuck	05/27/87	--
	Rolfite Canal/Shelton	Shelton	06/29/87	--
	Housatonic River Drums	Stratford	08/10/87	08/14/87
Maine	Eastern Surplus Co.	Meddybumps	11/20/86	--
	Kennebec (Flood)	Kennebec	04/09/87	04/18/87
	Androscogin Rivers	Pennobs	04/09/87	04/14/87
	*McKin Company	Gray	09/28/87	--
Massachusetts	Breakneck Road	Southbridge	12/09/86	12/21/86
	Beal Street Drum	Hingham	--	10/06/86
	Silresim Chemical Co.	Lowell	12/18/86	12/19/86
	High Sachem Site	Mashpee	--	12/17/86
	Abandoned Drum	Cape Cod	12/19/86	04/01/87
	Industrial Avenue	Lowell	04/01/87	04/16/87
	Salem Acres	Salem	04/10/87	--
	Nanpasket Beach	Hull	04/22/87	04/23/87
	Nyanza Chemical Waste Dump	Ashland	06/30/87	--
	Cannon Engineering Corp.	Bridgewater	08/10/87	--
	*Nyanza Chemical Dump	Ashland	04/21/87	04/30/87
	*Wells G&H	Woburn	09/28/87	--
	South Street Site	Walpole	09/28/87	--
New Hampshire	Oakland (20)	Nashua	04/01/87	--
	Nowell Street (29)	Nashua	04/01/87	--
	Russel Avenue (28)	Nashua	04/01/87	--
	West Bank	Nashua	04/01/87	--
	13 Niquette (27)	Nashua	05/15/87	--
	17 Niquette	Nashua	05/15/87	--
	Auburn Road	Londonderry	--	11/28/86
	Hall Street	Bow	--	05/24/87
	South Bank Asbestos	Nashua	--	05/26/87
Rhode Island	Menemsha	Providence	09/22/87	--
Vermont	Old Springfield Landfill	Springfield	06/30/87	07/20/87

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* Potentially Responsible Party Removals. All others are Fund-financed removals.

Source for Removals: Removal Tracking System (RTS) Report of November 9, 1987 for FY87 only.

Progress Toward Implementing Superfund: Fiscal Year 1987

FISCAL 1987 REMOVALS
(continued)

	Site	Location	Start Date	Completion Date
REGION 2				
Puerto Rico	Camuy River Dump	Puerto Rico	03/26/87	04/22/87
New Jersey	Camplain Road	Hillsborough	10/16/86	10/16/86
	Perona Tire Fire	Atlantic	12/07/86	12/12/86
	Minsei	Woodlawn Township	12/22/86	02/02/87
	Arkansas Co.	Newark	01/20/87	--
	Industrial Latex	Wallington	04/01/86	01/30/87
	Atlantic Resources	Sayreville	02/05/87	--
	Signo Delta Warehouse	Wall Township	--	02/23/87
	Chemical Leaman Tank Line	Bridgeport	03/06/87	03/28/87
	Route 518 Franklin Twnshp	Franklin Township	03/16/87	--
	Industrial Latex	Wallington	04/09/87	--
	Delaware River	Glouster	06/02/87	06/25/87
	Hillsborough - Rte. 206	Hillsboro	--	08/25/87
	*Scientific Chemicals	Carlstadt	--	12/15/86
	*Scientific Chemicals	Newark	--	04/27/87
	*Delancey St. Trailer	--	--	05/04/87
New York	Clothier Disposal	Granby	10/07/86	--
	Madison Wire Co.	West Seneca	--	09/09/87
	Shirley #2	Broadway	--	09/25/87
	American Thermostat	South Cairo	10/27/86	--
	Wide Beach	Brant	10/29/86	12/19/86
	Bossert	Utica	11/08/86	--
	Parthey Lane	Amityville	11/14/86	07/16/87
	Signo/Mt. Vernon	Mt. Vernon	12/08/86	--
	Asbestos Dumping	E. Farmingdale	12/19/86	12/24/86
	Pine Street	E. Moriches	02/13/87	--
	N. Lindenhurst	Babylon	02/27/87	08/28/87
	Armonk	Village of Armonk	03/03/87	--
	Blooming Grove	Orange County	03/25/87	06/22/87
	Signo/Kenston	Brooklyn	03/26/87	06/20/87
	Pollution Abatement Serv.	Oswego	04/23/87	--
	Primo Shield	Utica	--	04/30/87
	Fulton Terminals	Fulton	05/02/87	05/04/87
	Gazzola Drive	Long Island	--	05/15/87
	Signo/Coty	Staten Island	--	05/20/87
	Ridge Road at Route 20	Pompey	05/22/87	--
	Fort Solonga	Smithtown	06/18/87	--
	Hyde Park Drum Site	Dutchess County	07/02/87	07/02/87
	Town of Kent	Putnam County	07/02/87	07/02/87
	Lincoln Avenue	Port Jefferson	07/10/87	--
	Rosen Site	Courtland	07/17/87	--
	Moreland Site	Commack	07/24/87	09/03/87
	Fulton Terminals	Fulton	08/20/87	09/03/87

FISCAL 1987 REMOVALS
(continued)

	Site	Location	Start Date	Completion Date
REGION 2 (Continued)				
New York (Continued)	Fort Drum	Watertown	08/24/87	09/22/87
	Asbestos/Torrey Place	Yonkers	09/03/87	09/06/87
	Sarney Farms	Amenia	09/29/87	--
	Fulton Terminals	Fulton	--	12/15/86
	*Fulton Terminals	Fulton	--	03/05/87
	*Fulton Terminals	Fulton	11/10/86	--
Virgin Islands	Tutu Well Site	St. Thomas	08/21/87	--
		St. John	--	09/15/87
REGION 3				
Delaware	Atlantic Ave. Drum Site	Elsmere	05/11/87	--
	Tybouts Corner Landfill	New Castle Co.	06/08/87	06/27/87
	Delaware River II	Augustine Beach	06/09/87	07/16/87
	Indian River	Indian River	08/18/87	--
	Delaware Bay Drum	Camden	08/25/87	--
Maryland	Oakland Junkyard	Oakland	11/26/86	--
	Iron Hill Drum Site	Cecil County	03/05/87	--
	Kane & Lombard St. Drum	Baltimore	03/23/87	05/05/87
	Capital Assay Labs	Baltimore	05/26/87	06/27/87
Pennsylvania	Keyser Avenue Borehole	Lackawana	--	03/16/87
	Mill Creek Dump	Erie	--	03/22/87
	Sandonelle PCB	Finedley Towns	--	03/30/87
	Swissvale Auto	Swissvale Boro	--	05/08/87
	Howard Rodger's Drum	Franklin	--	05/22/87
	Trowbridge Estates Mercury	Southampton	--	06/27/87
	Johnson Bronze	New Castle	--	09/02/87
	Pagan Road	Erie County	--	09/02/87
	SSCD Schoolyard Site	Punxsutawney	10/16/86	03/12/87
	American Insulator	New Freedom	11/03/86	--
	Hereford Twp. Groundwater	Berks County	12/02/86	--
	Taylor Borough Dump	Taylor Borough	12/22/86	04/17/87
	Durham Twp. Solvent Spill	Durham	01/18/87	02/04/87
	Kevak Property	Glen Lyon	02/11/87	--
	Deardorff Drive	Newberry Township	02/13/87	--
	Aladdin Plating	Scott Township	03/03/87	--
	Metcoa Radiation Site	Pulaski	03/10/87	05/20/87
	Donegal Twp. Midnight Drum	Butler County	03/13/87	08/08/87
	Lancaster Battery	Manheim	03/23/87	08/12/87
	Wachs Landfill	West Newton	04/08/87	--
	Ashland Chemical	Philadelphia	04/19/87	04/19/87
	Solly Ave., Midnight Drum	NE Philadelphia	05/02/87	--

FISCAL 1987 REMOVALS
(continued)

	Site	Location	Start Date	Completion Date
REGION 3 (Continued)				
Pennsylvania (Continued)	Rt. 563 Drum Site	Salford	06/04/87	--
	Whitemarsh Twp. Drum	Plymouth Meeting	06/15/87	06/17/87
	Trowbridge Estates	Southampton	06/24/87	06/27/87
	Ridge Road Site	East Falls	06/26/87	--
	American Street Tannery	Philadelphia	08/06/87	--
	Belfield Avenue Site	Philadelphia	08/24/87	--
	Cryochem	Worman Township	09/04/87	--
	Rotunda Drive	Erie County	--	01/14/87
	*Tyson's Dump	Upper Merion	04/13/87	--
	*Shriver's Corner	Straban Township	--	11/30/86
	*Hunterstown Road	Straban Township	03/20/87	08/15/87
	*M.W. Mfgr.	Valley Township	02/06/87	--
	*M.W. Mfgr.	Valley Township	03/12/87	--
	*Paoli Rail Yard	Paoli	07/14/87	--
	*C&D Recycling	Foster Township	08/26/87	--
	*Eastern Diversified Metals	Hometown	08/07/87	--
	*Duncansville Tanker	Duncansville	03/24/87	03/24/87
Virginia	Bent Creek/James River	Lynchburg	--	03/03/87
	Roanoke River Drum	Roanoke	--	03/05/87
	C&R Battery Co.	Chesterfield	--	08/26/87
	Lynnhaven Bay	Virginia Beach	03/10/87	06/30/87
	Tidewater TNT	Suffolk	04/23/87	04/27/87
	Chesapeake Bay	Assateque National Park	06/12/87	06/30/87
	*Atlantic Wood Industries	Portsmouth	--	07/23/87
West Virginia	Kabletown Road	Jefferson County	--	12/17/86
	Harris Property	Poca	--	05/20/87
	Wheeling Acid Spill	Wheeling	02/27/87	04/13/87
	Edwards Road Site	Coalburg	03/26/87	04/22/87
	Fraziers Bottom PCB Site	Fraziers Bottom	04/22/87	--
	Sasser Electric Co.	Mt. Hope	05/26/87	--
	Harrison Co. PCB Spill	Harrison	06/04/87	09/27/87
	Ridgeview PCB Site	Boone	07/22/87	--
	Keystone Drive Pesticide	Charleston	07/24/87	--
	Upper Glade Drum	Upper Glade	08/03/87	--
	Ray York Body Shop Drum	Oak Hill	08/12/87	--
	Garfield Street Drum	McMechen	08/17/87	--
	Atwell Mt. Drum	Atwell	09/01/87	--
	Cummings Salvage Yard	Sedalia	09/16/87	--
	Lakin State Farm	Chester	08/06/87	--

FISCAL 1987 REMOVALS
(continued)

	Site	Location	Start Date	Completion Date
REGION 4				
Alabama	Turkey Creek Barrel Dump	Birmingham	--	01/13/87
	Mowbray Engineering Co.	Greenville	06/04/87	08/15/87
	Welco Inc.	Jackson	06/25/87	--
	Ingram Property	Morgan	07/14/87	07/28/87
Florida	Hollingsworth Solderless	Ft. Lauderdale	02/05/87	02/13/87
	Person's Property PCB Drum	West Palm Beach	05/11/87	05/13/87
	Ellis Road	Jacksonville	09/04/87	09/04/87
	ORI	Ft. Walton Beach	09/19/87	09/26/87
	Bay Drum	Tampa	09/21/87	--
	*Florida Steel Company	Indiantown	09/25/87	--
Georgia	Naomi Drum Site	Naomi	--	10/21/86
	Sweetwater Creek Drums	Douglasville	--	01/28/87
	Zenith Chemical	Dalton	--	10/10/86
	Kenyon St. Drum	Atlanta	02/26/87	03/20/87
	Pulverizing Plant Drum	Chamblee	03/24/87	06/03/87
	Helton Property Site	Dalton	04/02/87	05/15/87
	Line Crest Way	Decatur/Dekalb	04/23/87	05/30/87
	McDonald Farm	Dalton	04/27/87	09/15/67
	Banks Co.	Atlanta	05/20/87	--
	Hollywood Cemetary Site	Atlanta	06/01/87	08/18/87
	Barnes Mill Drum	Marietta	06/04/87	06/05/87
	Dade Co. Drum	--	07/22/87	--
	Dickerson Post Treatment	Homerville	07/22/87	--
	Michael's Road	Trenton	07/23/87	--
	Mathis/Chicamauga	LaFayette	07/23/87	--
	Newnan Landfill	Newnan	09/01/87	09/01/87
Kentucky	Bowling Green Toxics	Bowling Green	--	03/31/87
	Chenault Rectifiers	Richmond	02/05/87	02/06/87
	Lee's Lane Landfill	Louisville	03/17/87	--
	Nichro Plating Co.	Louisville	03/18/87	07/09/87
	A.L. Taylor (Valley of Drums)	Brooks	04/21/87	08/13/87
	Newport Dump Site	Newport	06/30/87	--
	Taylorsport Sand & Gravel	Taylorsport	07/20/87	--
Mississippi	Prentiss Creosote	Prentiss	03/30/87	--
	Benton Furniture	Ashland	05/15/87	07/16/87
	Goodken Farms	Senatobia	06/15/87	--
North Carolina	Sanford Plating Company	Sanford	--	10/10/86
	Rowes Corner Drum Dump	Rowes Corner	--	01/14/87
	Humpback Mountain	Spruce Pine	10/21/86	04/15/87

FISCAL 1987 REMOVALS
(continued)

	Site	Location	Start Date	Completion Date
REGION 4 (Continued)				
North Carolina (Continued)	Alandale Drive	Wilmington	01/09/87	03/17/87
	Cape Fear Wood Preserving	Fayetteville	01/30/87	02/10/87
	Queens Property	Charlotte	02/05/87	02/11/87
	U.S. 70 Dump	Morgantown	03/09/87	04/15/87
	Hollingsworth Pesticide	Fayetteville	03/31/87	07/09/87
	Auburn Church Road	Raleigh	04/14/87	09/17/87
	Furnace Road	Lincolnton	04/15/87	09/17/87
	Buckhorn Road	Sanford	04/30/87	09/17/87
	Laurel Springs PCB Site	Laurel Springs	05/12/87	06/15/87
	Beach Containers	Oregon Inlet	05/15/87	06/30/87
	Gaston Co. Drum	Gastonia	05/28/87	--
	Cleveland Co. Drum	Shelby	05/28/87	--
	Union Co. Drum	Monroe	05/29/87	--
	Bostic Drum	Holly Ridge	08/04/87	--
	Carolina Production	Asheville	09/14/87	--
South Carolina	Lando Drum	Lando	--	12/05/86
	Woodward Property	Myrtle Beach	04/07/87	04/09/87
	Babb Drums	Little Chicago	04/08/87	05/11/87
	Kershaw Co. Landfill	Kershaw County	--	10/08/86
	Donaldson Roadside Dump	Greenville	09/10/87	--
Tennessee	Jacques Miller	Nashville	01/06/87	04/24/87
	Gallaway Ponds Site	Gallaway	06/25/87	--
REGION 5				
Illinois	Autocrat	New Athens	03/30/87	--
	Chem Pac	Chicago	06/04/87	--
	Byron/Johnson Salvage	Byron	--	10/27/86
	Belvidere Municipal Landfill	Belvidere	--	12/09/86
	A-Chemical	Chicago	--	02/27/87
	*IBS Inc.	Peoria	04/21/87	04/21/87
Indiana	Cantu Well	Gary	--	11/14/86
	Midwest Plating-Kokomo	Kokomo	--	11/21/86
	Tyler St. Drums	Gary	--	12/30/86
	Portage Drums	Portage	--	12/30/86
	Main St. Well	Elkhart	--	04/03/87
	Monon Waterworks	Monon	--	06/19/87
	Shelton Wells	Columbus	--	07/01/87
	I.J. Recycling	Ft. Wayne	11/03/86	06/19/87
	Meyers Dump	Osceola	02/11/87	09/08/87
	Cam-Or	Westville	03/20/87	--
	Wedzeb Enterprises	Lebanon	04/13/87	09/30/87

FISCAL 1987 REMOVALS
(continued)

	Site	Location	Start Date	Completion Date
REGION 5 (Continued)				
Indiana (Continued)	Sycamore Street	Elkhart	05/18/87	06/16/87
	Tri-State	Columbus	06/02/87	09/25/87
	9th Avenue Dump	Gary	09/29/87	--
	*Wayne Waste Oil	Columbia City	--	09/11/87
	*INJ Corp.	Ft. Wayne	11/03/86	02/15/86
Michigan	Verona Well Field	Battle Creek	--	01/06/87
	Carter Industrial	Detroit	--	07/06/87
	Mt. Elliot Drum	Detroit	10/30/86	10/31/86
	G&H Landfill	Utica	03/18/87	03/18/87
	S.E.R. Plating	Kalamazoo	04/29/87	--
	Selkirk-Benham St. Drums	Detroit	05/23/87	--
	Pioneer Equipment Co.	Detroit	07/22/87	--
	International Disk Co.	Ellsworth	07/29/87	--
	G&H Landfill	Utica	07/30/87	--
	Plating Equipment Used	Detroit	08/19/87	--
	Stevenson Road Drums	Clinton	09/04/87	--
	Verona Well Field	Battle Creek	09/13/87	09/21/87
Minnesota	St. Louis River	Duluth	06/08/87	--
Ohio	Central Waste Landfill	Alliance	--	01/30/86
	Petroleum Power & Maintenance	Louisville	--	04/23/87
	Chemco	Astabula	11/06/86	--
	Summit Equipment	Akron	03/10/87	09/25/87
	Summit National	Deerfield Twp.	03/25/87	--
	Dayton Tire	Dayton	04/03/87	--
	Liquid Waste Management	Shandon	04/08/87	05/08/87
	Asbestos Bags Orwell	Orwell	04/30/87	05/06/87
	Krejci Drums	Cleveland	06/09/87	--
	Greiners Lagoon	Fremont	08/31/87	--
	*Laskin/Poplar Oil	Jefferson Township	--	06/15/87
	*Summit National	Deerfield	03/26/87	--
	*Allied Chem. & Ironton Coke	Ironton	03/30/87	--
	*Troy Railroad	Troy	--	12/31/86
	*CCC & St. Louis RR	Troy	--	12/31/86
Wisconsin	Better Brite Chrome	DePere	--	01/29/87
	Reuping Leather Co.	Fondulac	10/18/86	10/24/86
	Reuping Leather Co.	Fondulac	01/21/87	05/18/87
	Chem Sciences	Germantown	04/06/87	--
	Better Brite	Chipawa	05/04/87	--
	Malleable Range Co.	Beaver Dam	06/03/87	09/24/87
	Oconomowoc Electroplating	Ashippin	06/30/87	07/20/87

FISCAL 1987 REMOVALS
(continued)

	Site	Location	Start Date	Completion Date
REGION 6				
Wisconsin (Continued)	Lubricants Inc.	West Allis	09/19/87	--
	*Anchor Coating Co.	--	03/03/87	03/10/87
Arkansas	Allen Transformer	Fort Smith	--	04/09/87
	Vertac	Jacksonville	01/26/87	--
	Batesville Landfill Fire	Batesville	04/01/87	04/07/87
	Greens PCB Drums	Ozark	05/05/87	06/12/87
	Old Henley	Norphlet	08/18/87	--
	*Vertac Inc.	Jacksonville	12/18/86	02/04/87
	*Arkwood Inc.	Omaha	08/12/87	08/13/87
New Mexico	Cimarron Mining	Carrizozo	08/11/87	08/20/87
Oklahoma	10th St. Frazier Pits	Oklahoma City	--	04/15/87
	*Hordage/Criner	Criner	09/23/87	--
Texas	Padre & Mustang (86)	Gulf Coast	--	02/26/87
	Skylark	Pearland	--	04/15/87
	Heritage/Laurel	Friendswood	--	09/16/87
	Motco, Inc.	LaMarque	12/08/86	12/17/86
	Niagara Chemical	Harlikgen	12/22/86	01/03/87
	Texarkana Wood Preserving	Texarkana	12/23/86	01/30/87
	J&J Plastics	Turney	02/20/87	02/22/87
	Padre Island (87)	Gulf Coast	02/26/87	--
	Hastings-Offsite	Pearland	03/02/87	--
	Holley Residence	Friendswood	03/05/87	04/18/87
	Dempsey Residence	Pearland	03/05/87	08/13/87
	Senuta Residence	Friendswood	03/09/87	--
	Love Residence	Friendswood	03/12/87	--
	Pirates Beach	Galveston Is.	06/15/87	06/26/87
	Texarkana Wood Preserving	Texarkana	07/28/87	08/25/87
	Bestplate Inc.	Hutchins	08/18/87	08/18/87
	*Sheridan Disposal	Hempstead	07/13/87	09/17/87
REGION 7				
Iowa	Michael Battery	Bettendorf	11/04/86	05/26/87
	Eginoire Fertilizer	Lorimor	03/13/87	--
	*Michael Battery	Bettendorf	--	06/19/87
Kansas	Beauty Rose Chemical	Kansas City	03/04/87	03/31/87
	Cherokee County	--	--	02/27/87
	*KP&L Gas Service	Topeka	--	06/19/87

Progress Toward Implementing Superfund: Fiscal Year 1987

FISCAL 1987 REMOVALS
(continued)

	Site	Location	Start Date	Completion Date
REGION 7 (Continued)				
Missouri	Nodaway Drums	Nodaway	02/18/87	02/20/87
	Rose Chemical	Holder	--	04/03/87
	Rose Chemical	Holder	10/28/86	--
	Dearborn Drums	Dearborn	01/30/87	03/06/87
Indiana	Chesterfield Tank	St. Louis River	03/25/87	03/27/87
	Weaver Drums	Kansas City	05/11/87	05/11/87
	B&B Salvage	Warrensburg	05/26/87	--
	Delmar Street Drums	St. Louis	06/22/87	--
	Scott's Lumber	Alton	08/24/87	--
	North 'U' Drive PCBs	Springfield	09/14/87	09/24/87
	*Lee Chemical	Liberty	03/16/87	--
	*Chemical Commodities	Kansas City	--	02/27/87
	*U.S. Polymer	St. Louis	--	04/27/87
Nebraska	Murdock Groundwater	Murdock	--	03/13/87
	*Willis Pyrolizer	Jackson	--	10/01/86
REGION 8				
Colorado	Herold Site	Black Hawk	--	10/11/86
	Camax	Adams City	10/01/86	03/02/87
	Clear Creek/Central City	Idaho Springs	03/27/87	04/29/87
	Farmers Irrigation Ditch	Broomfield	04/30/87	--
	Englewood DDT	Englewood	05/01/87	--
	Mule Creek Drums	Adams County	06/30/87	--
	Graff Drums	Ft. Morgan	06/30/87	--
	Rocky Mtn. Custom Chrome	Colorado Spring	08/27/87	--
	High Quality Circuits	Colorado Spring	09/21/87	--
	Clear Creek/Central City	Idaho Springs	09/30/87	--
North Dakota	Arsenic Trioxide	Southeastern	--	12/10/86
South Dakota	Cheyenne River Sioux Reservation	Eagle Butte	08/31/87	--
Wyoming	Brookhurst Subdivision	Casper	12/15/86	--
REGION 9				
Arizona	Dela-Tek	Coolidge	11/17/86	11/23/86
	Standford Site #1	Yuma	03/28/87	--
	Standford Site #2	Yuma	03/28/87	--

Progress Toward Implementing Superfund: Fiscal Year 1987

FISCAL 1987 REMOVALS
(continued)

	Site	Location	Start Date	Completion Date
REGION 9 (Continued)				
California	Garden Valley	El Dorado Co.	--	10/03/86
	California Bionuclear	Sun Valley	01/28/87	01/29/87
	Garvey Avenue	Baldwin Park	--	04/25/87
	Operating Industries	Monterey Park	--	07/31/87
	E.C. Kramer	Anaheim	11/19/86	05/15/87
	Creative Dynamics	San Diego	01/12/87	07/30/87
	Rigel St.	San Diego	02/09/87	04/29/87
	ABCO Metal	Monrovia	05/18/87	--
	Aero Quality Plating	Oakland	05/19/87	06/15/87
	South Bay Asbestos Area	Alviso	06/29/87	07/06/87
	Del Norte Pesticide	--	08/25/87	--
	Lorentz Barrel & Drum	San Jose	09/08/87	--
	Purity Oil	Malaga	09/14/87	09/16/87
	*J.H. Baxter Co.	Weed	--	01/31/87
Guam	*Outer Island Sites	--	03/16/87	04/10/87
Hawaii	Hauula Beach Park	Hawaii	03/23/87	06/09/87
Nevada	Polycarb Wells	Wells	06/22/87	--
REGION 10				
Idaho	Arrcom	Rathdrum	05/01/87	--
	Greenspeed Lawncare	Boise	08/05/87	--
Oregon	Williamette River	Portland	03/11/87	06/09/87
Washington	American Crossarm	Chehalis	11/26/86	--
	Olympia Pesticide Fire	Olympia	06/16/87	06/27/87
	Lake WA Ship Channel	Seattle	06/19/87	06/19/87
	Spokane Junkyard	Spokane	07/20/87	--
	Lake Washington Drum	Seattle	08/26/87	--

APPENDIX C

DETAILED ROD DESCRIPTIONS

This appendix provides detailed descriptions of FY87 feasibility studies (FSs) as required by CERCLA section 301(h)(1)(A). These descriptions are based on Records of Decision (RODs) signed after 11/17/86, when the section 121 cleanup standards added by SARA became fully effective. Although a total of 75 RODs were signed in FY87, four of these were signed before 11/17/86; 70 RODs are summarized in this appendix (rather than 71) because a single ROD was signed for two actions: the Environ-Chem and Northside Landfill sites in Indiana.

Each summary provides background information on the Superfund site, including the type of operation, contaminants of concern, past investigations, description of operable units, and the enforcement status. The section on site work provides the date of the remedial investigation (RI) initiation and key findings of the RI. The third section describes the FS, including the alternative remedial actions considered, the major Federal or State applicable or relevant and appropriate requirements (ARARs) identified for the site, and a summary of community involvement. In the last section, the selected remedial alternative is described. This section also provides information on the use of alternative or resource recovery treatment technologies and how well the selected remedy meets the requirements of CERCLA.

All sites summarized in the appendix are listed below by EPA Region. The National Priorities List (NPL) number given is the site ranking as of July 30, 1987. Proposed NPL sites are placed in groups (Gr) corresponding to groups of 50 on the final NPL. Federal facility sites are placed in similar groupings and designated by the letter "F" following the group number. The entity leading the project is also listed, i.e., Federal lead by the EPA remedial program and Fund-financed (F); EPA enforcement program lead (ENF); potentially responsible party lead (PRP).

APPENDIX C

DETAILED ROD DESCRIPTIONS
(continued)

	Site	State	Region	NPL Rank	Lead	Page
1.	Davis Liquid	RI	1	216	F	193
2.	Ottati & Goss/GLCC	NH	1	130	F	196
3.	Resolve Inc.*	MA	1	206	F	198
4.	Browning-Ferris South Brunswick LF	NJ	2	125	ENF	201
5.	Chemical Control Corp.*	NJ	2	223	F	204
6.	Cooper Road Dump	NJ	2	473	F	207
7.	Diamond Alkali	NJ	2	523	PRP	209
8.	Montgomery Twp. Housing Development	NJ	2	438	F	211
9.	Renora Inc.	NJ	2	378	ENF	214
10.	Waldick Aerospace Devices	NJ	2	271	F	217
11.	Williams Property	NJ	2	377	F	220
12.	Endicott Village Well Field	NY	2	507	F	223
13.	G.E. Moreau	NY	2	52	ENF	225
14.	Haviland Complex	NY	2	607	F	228
15.	Katonah Municipal Well	NY	2	527	F	231
16.	Suffern Well Field	NY	2	506	F	234
17.	Volney Landfill	NY	2	627	F	237
18.	Vega Alta Public Supply Wells	PR	2	334	ENF	240
19.	Kane and Lombard	MD	3	724	F	243
20.	Palmerton Zinc	PA	3	306	F	246
21.	Presque Isle	PA	3	376	PRP	248
22.	Saltville Waste Disposal	VA	3	737	F	250
23.	West VA Ordnance Works	WV	3	89	PRP	252
24.	Gold Coast Oil Corp.	FL	4	67	F	254
25.	NW 58th Street Landfill	FL	4	181	F	257
26.	Parramore Surplus Co.	FL	4	455	F	260
27.	Tri-City Conservationist Corp.	FL	4	408	F	262
28.	Tower Chemical Company	FL	4	286	F	264
29.	Powersville Landfill	GA	4	517	ENF	267
30.	Newport Dump	KY	4	453	F	270
31.	Sodyeco	NC	4	151	PRP	272
32.	Geiger	SC	4	640	F	274
33.	Independent Nail Co.	SC	4	62	F	276
34.	Palmetto Wood Preserving	SC	4	420	F	279
35.	Johns-Manville	IL	5	428	PRP	282
36.	Enviro-Chem Corp./Northside LF**	IN	5	240/249	ENF	285
37.	Marion/Bragg LF	IN	5	530	F	288
38.	Seymour Recycling Corp.*	IN	5	57	ENF	291
39.	Liquid Disposal Inc.	MI	5	24	F	294
40.	Rose Township Dump	MI	5	166	F	297
41.	FMC Corp.	MN	5	17	PRP	300
42.	New Brighton (St. Anthony)*	MN	5	39	F	303

APPENDIX C

DETAILED ROD DESCRIPTIONS
(continued)

	Site	State	Region	NPL Rank	Lead	Page
43.	New Brighton (TCAAP)*	MN	5	39	PRP	306
44.	Industrial Excess LF	OH	5	164	F	309
45.	Laskin/Poplar Oil*	OH	5	492	F	311
46.	Northern Engraving Corp.	WI	5	414	PRP	314
47.	Schmalz Dump*	WI	5	190	F	317
48.	Bayou Bonfouca*	LA	6	731	F	320
49.	Cleve Reber	LA	6	196	F	323
50.	Compass Industries LF	OK	6	483	F	326
51.	Sand Springs Petrochemical	OK	6	761	F	328
52.	Crystal City Airport	TX	6	639	F	331
53.	Highlands Acid Pit*	TX	6	450	F	333
54.	Petro-Chemical Systems, Inc.	TX	6	728	F	335
55.	Conservation Chemical Co.	MO	7	Gr 15	PRP	338
56.	Minker (Romaine Creek)*	MO	7	474	F	340
57.	Minker (Stout)*	MO	7	474	F	343
58.	Clear Creek/Central City	CO	8	157	F	346
59.	Denver Radium (I)*	CO	8	284	F	349
60.	Denver Radium (II)*	CO	8	284	F	352
61.	Denver Radium (III)*	CO	8	284	F	355
62.	Denver Radium (Card Corp.)*	CO	8	284	F	358
63.	Denver Radium (Open Space)*	CO	8	284	F	361
64.	Rocky Mountain Arsenal	CO	8	Gr 2F	ENF	364
65.	Phoenix-Goodyear Airport	AZ	9	254	ENF	367
66.	Operating Industries Inc. LF	CA	9	71	ENF	370
67.	San Fernando Valley	CA	9	343	F	372
68.	San Gabriel*	CA	9	341	F	374
69.	Stringfellow Acid Pits*	CA	9	32	F	377
70.	Colbert LF	WA	10	356	F	380

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* Subsequent operable units.

** Two adjacent sites with one ROD.

DAVIS LIQUID SITE
SMITHFIELD, RHODE ISLAND

HRS Score: 47.25 **NPL Rank:** 216

Background

The Davis Liquid site covers 15 acres and is located in a rural section of the town of Smithfield in Providence County, Rhode Island. Although the site is bounded by forest and wetlands, the area is under increasing low-density residential use; there are 100 homes within one mile of the site. Areas of natural resource importance in the vicinity of the site include surrounding wetlands, the aquifers underlying the site damage area, and the Stillwater Reservoir. The wetlands provide habitat for many plant and animal species and the aquifers are tapped by local residents as their sole source of water supply. Stillwater Reservoir is a Class B water body and a potential water supply for the Town of Smithfield.

The site served as a disposal location for a variety of liquid and solid wastes throughout the 1970s. Drummed wastes and bulk liquid wastes from tank trucks were dumped into the unlined pits and lagoons at the site. In 1978, after a tire fire at the site and subsequent investigation, approximately six to eight residents brought their concerns to the Smithfield Town Council. A court order in 1978 prohibited the disposal of hazardous waste at the site. At that time, State efforts to gain access to the site were met with a series of legal challenges by Mr. Davis, the site owner, which resulted in delays in addressing the contaminants on site. A group of citizens lobbied the Town Council for closure of the site and initiated legal and investigative action against the site owner.

In 1980, the Rhode Island Department of Environmental Management (RIDEM) conducted a full-scale ground-water contamination study of monitoring wells on the Davis property and surrounding residential properties. Contaminants were found in both the ground-water wells on and off site and the surface water adjacent to the Davis site. A finding of contaminants at concentrations above EPA health and safety criteria prompted RIDEM to supply bottled water to residents using the affected wells.

EPA and the State of Rhode Island signed a cooperative agreement to initiate a State lead remedial investigation/feasibility study (RI/FS). The site was placed on the NPL in September 1983. The RI was completed by EPA in November 1986, following initial work by RIDEM. The FS was released for public comment in July 1987. The ROD was signed September 29, 1987. Approximately 26 potentially responsible parties (PRPs) were issued General Notice Letters encouraging them to perform the response activities necessary to cleanup the site. Negotiations with the PRPs are currently ongoing.

Description of Site Work

In 1985, the U.S. Government brought action against the members of the Davis family to ensure access for EPA to complete the RI/FS. During the winter of 1985, EPA removed approximately 600 drums containing hazardous wastes. The wastes disposed of at the site include neutralized wastes from incinerated toxic materials, drums containing chemical and sewage sludges, waxes and liquids, and liquids that included organic solvents.

Data from the RI indicate that significant quantities of hazardous substances remain on site following the removal actions. Contamination was found in the soil, ground water, surface water, and sediments on site, in the overburden and bedrock aquifer, and in the ground water and surface water off site. Volatile organic contaminants such as trichloroethylene (TCE) toluene and xylene were found in high concentrations. Inorganic contaminants included lead and nickel at concentrations in excess of Federal aquatic toxicity criteria for chronic effects. The filling of wetlands with debris (e.g. tires) has increased water levels at the site, threatening the wetlands vegetation.

Description of Feasibility Study

The objective of the FS was to develop alternatives for controlling the source of contamination and preventing further migration of the contaminants. Alternatives were evaluated with regard to CERCLA criteria. The alternatives comprised two types of remedies: source control (soil) and management of migration (ground water, surface water, and sediments). The following alternatives were considered:

(1) No action alternative;

(2) Source control alternatives --

- on-site low-temperature thermal soil treatment;
- on-site thermal destruction; and
- off-site thermal destruction.

(3) Management of migration alternatives --

- on-site treatment of the ground water and construction of an alternate water supply;
- combined treatment of contaminated surface water in the ground-water treatment system; and
- off-site sediment dredging and treatment.

In general, those commenters that submitted formal written and/or oral comments supported EPA's preferred alternative (see below). Community interest was high concerning the investigation of contaminated residential wells and public meetings were held on the results of the RI and the FS. Since the completion of the draft FS, most commenters had major concerns regarding the safety of air emissions from the incineration process.

Description of Selected Remedy

The selected remedial action is a comprehensive approach for site remediation. The source control component includes excavation of waste and soils, treatment by thermal destruction, and disposal in an on-site Resource Conservation and Recovery Act (RCRA) Subtitle C landfill. Surface-water runoff and ground-water recharge to the stream on site will be isolated for collection and treatment. Wetlands disturbed by the remedial action will be restored. The management of migration component includes the design and construction of an alternate water supply, and the design and construction of a ground-water extraction, treatment, and flushing system.

Major applicable or relevant and appropriate requirements (ARARs) considered included RCRA closure performance standards and ground-water protection requirements, the Clean Water Act (CWA), Safe Drinking Water Act (SDWA), Executive Order 11990 for Protection of Wetlands, Toxic Substances and Control Act (TSCA), and the Clean Air Act (CAA). Also, the remedy must be consistent with EPA Ground-water Protection Strategy, as the aquifer at the site is Class II and requires restoration. State ARARs include the RIDEM ground-water protection rules and regulations, and the Rhode Island Wetland Protection Act.

The selected remedy is expected to meet ARARs, complies with CERCLA's statutory preference for a remedy that significantly reduces the volume, toxicity, or mobility of hazardous substances, uses alternative treatment technologies, is cost-effective, and represents a permanent solution.

OTTATI AND GOSS/
GREAT LAKES CONTAINER CORPORATION SITE
KINGSTON, NEW HAMPSHIRE

HRS Score: 53.41 **NPL Rank: 130**

Background

The Ottati and Goss/Great Lakes Container Corporation (O&G/GLCC) site is located on approximately 35 acres in Kingston, New Hampshire. The O&G/GLCC comprises seven non-contiguous acres on the site. Since the late 1950s, the site has been used by several companies for the reconditioning of disposal drums and for the disposal of hazardous waste. Caustic rinse solutions from the reconditioning operations were released onto the site, and heavy sludges were brought to the site for processing, beginning in 1978. Volatile organic compounds (VOCs), acid and base/neutral (ABN) compounds, PCBs, and metals have contaminated ground water, surface water, and soils on the site. Some of the contaminants present, such as benzene, arsenic, and TCE, are known or suspected carcinogens. Individual residential wells derive ground water from aquifers in the area, although no residential well contamination has been attributed to the site.

On July 1, 1979, the New Hampshire Bureau of Solid Waste Management ordered the operators of the site to remove waste drums and to cease processing operations. A subsequent response action involved excavation and removal of 12,800 tons of drums and contaminated soils. The O&G/GLCC site was placed on the NPL in September 1981. The remedial investigation (RI) initiated in 1983 indicated contamination of soil, surface water, ground water, and sediments. In an effort to compel private parties to respond to the contamination, EPA filed a complaint in May 1980. The court concluded in 1985 that a number of parties are liable for the hazardous substances present at the site. The outcome of settlement proceedings, and the determination of responsibility for remediation, were not known at the time the ROD was signed on January 16, 1987.

Description of Site Work

The State lead RI/FS for the site was completed in August 1986. The RI indicated high concentrations of VOCs, PCBs, ABNs, metals, and cyanide in soils at numerous locations on the site. VOCs and metals are the principal contaminants in the ground water, and evidence suggests these compounds may be migrating off site. EPA believes that the soil contamination presents a direct contact risk, along with risks from ingestion of contaminated ground water.

Description of Feasibility Study

The feasibility study (FS) was conducted in 1986 to evaluate remedies for the O&G/GLCC site. EPA eliminated 12 of the initial 18 remedial alternatives during an initial screening phase. The remaining six alternatives were evaluated on the basis of engineering practice, protection of public health (including extent of compliance with ARARs), the use of alternative technologies, and cost. These six alternatives were as follows:

(1) No action, with site monitoring and restricted land use;

(2) Ground-water interception trench, on-site disposal of wastes, Resource Conservation and Recovery Act (RCRA) site cap, and source control;

(3) Alternative 2 plus ground-water extraction and treatment;

(4) Alternative 3 plus alternate water supply;

(5) Removal of contaminated soils and sediments to a RCRA facility; and

(6) Treatment of soils and sediments, ground-water treatment, and site cover.

Evaluation of the alternatives included consideration of their compliance with potential applicable or relevant and appropriate requirements (ARARs). The use of a RCRA cap would require compliance with RCRA standards, and the remaining waste on site would make RCRA closure and post-closure requirements relevant and appropriate. The Toxic Substances Control Act (TSCA) disposal standards for PCBs would also apply, as would requirements governing the removal of sediments from wetlands. The removal of wastes off site would be subject to RCRA and TSCA transportation and disposal regulations. The treatment of ground water, or destruction of contaminated soil by incineration, would also have to conform to Federal standards.

EPA held two public comment periods between September and December 1986 for interested parties to comment on the draft FS and the preferred alternative (see below). A third comment period, allowing for public response to a ground-water model of the site, began in late December 1986. Local citizens and local and State officials were actively involved with site activities. New Hampshire environmental authorities have collaborated with EPA personnel since 1981 in collecting and analyzing data.

Description of Selected Remedy

The preferred alternative, combining elements of several remedial options, includes excavation and incineration of selected PCB-contaminated soils, aeration of 14,000 cubic yards of soil to remove VOCs, and ground-water extraction, treatment, and monitoring. EPA believed that both source control and ground-water remediation were necessary to protect public health and the environment. The source control alternative is necessary to minimize the migration of contaminants into ground water and the risk associated with direct contact to the soils. This phase of the remedy uses incineration and aeration of VOCs, the latter of which is considered an innovative technology. EPA believes that treatment of the hazardous substances will be effective and reliable over the long term in minimizing risk. EPA's decision is consistent with the statutory mandate of CERCLA to select permanent solutions and alternative treatment technologies to the maximum extent practicable.

RESOLVE, INC., SITE
SECOND OPERABLE UNIT
NORTH DARTMOUTH, MASSACHUSETTS

HRS Score: 47.71 **NPL Rank: 206**

Background

The Resolve, Inc., site is located in North Dartmouth, Massachusetts, about 8 miles west of Fall River. The 6-acre site was used as a waste chemical reclamation facility from 1956 to 1980. The land surrounding the site primarily is zoned for residential use, and all of the nearby residences obtain their drinking water from private wells. The nearby Copicut River drains into Cornell Pond, a popular sport-fishing area.

During its operation as a chemical reclamation facility, the site received solvents, waste oils, organic liquids and solids, inorganic liquids and solids, and PCBs. Resolve disposed of the hazardous byproducts from its reclamation processes either in one of four unlined lagoons located on the site, or by landfarming, a method by which wastes are spread into the soils of the site. In 1974, the Massachusetts Division of Water Pollution Control granted Resolve a license to collect hazardous waste from 1974 to 1980. However, in December 1980 Resolve surrendered its license after the Department discovered violations of the license provisions. Investigations conducted by the Department at that time showed no migration of contaminants from the four lagoons. Resolve removed drums, buildings, and loading and unloading pads in 1981, but did not empty the contents of the lagoons. When leaching of wastes was discovered in 1982, EPA placed the site on the NPL.

EPA initially divided remedial activities at the site into two operable units. EPA initiated a remedial investigation (RI) for the first operable unit in the fall of 1982 to assess the extent of on-site source contamination. Following the completion of this RI in June 1983, EPA undertook a feasibility study (FS) that recommended source material be excavated and the site be encapsulated. A ROD for the on-site operable unit was signed on July 1, 1983. From September 1985 to February 1986, EPA conducted the RI/FS for the second operable unit to assess off-site contamination. In April 1985, before the ROD for the off-site operable unit was signed, EPA became aware that on-site PCB contamination was more extensive than originally believed, and that PCBs were migrating off site. In September 1985, EPA initiated a comprehensive on- and off-site RI/FS to determine the extent of the PCB contamination. EPA completed this comprehensive RI/FS in February 1987 and the ROD was signed in September 1987.

Description of Site Work

The results of the final, comprehensive RI indicated that PCBs were present in on-site soils in significant concentrations despite the earlier removal action, and that, as a result of their having dissolved in solvents that were also located in the soil, PCBs were migrating through ground water toward the Copicut River. EPA also identified other hazardous constituents of concern, including methylene chloride, 2-butanone, and toluene. The four major sources of contamination at the site were located primarily around the lagoons. The RI concluded that these sources had contaminated on-and off-site ground water and off-site surface water, in addition to the soil.

Description of Feasibility Study

The comprehensive FS identified remedial actions that would result in source control and stop the migration of contaminants. Seven remedial options remained after a preliminary screening:

(1) No action;

(2) On-site thermal destruction of 64,000 cubic yards of contaminated soils;

(3) On-site dechlorination of 64,000 cubic yards of contaminated soils;

(4) Encapsulation of the site, *in situ* flushing of contaminated soils, and treatment of source materials having the highest concentrations of PCB contamination;

(5) Off-site thermal destruction of contaminated soils;

(6) On-site treatment of ground water; and

(7) Heated influent air stripping of ground water.

The FS also identified applicable or relevant and appropriate requirements (ARARs) for each of the remedial alternatives. These ARARs included Resource Conservation and Recovery Act (RCRA) disposal and closure requirements, Toxic Substances and Control Act (TSCA) PCB cleanup standards, Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs), and Department of Transportation (DOT) regulations for the transportation of hazardous wastes.

Citizen involvement in the RI/FS and selection of remedy processes was substantial. EPA held several public meetings to explain the remedies, and actively encouraged the development of a Citizen's Advisory Committee. Several commenters commended EPA for selecting an innovative technology to remediate the Resolve site (see next section for description). The State of Massachusetts also was consulted and concurred with the remedy selected.

Description of Selected Remedy

The remedy selected (Alternative 3) addressed both source control and prevention of the migration of contaminants. Specifically, the remedy included:

- Excavation of 22,500 cubic yards of PCB-contaminated soils, treatment in a mobile dechlorination unit to achieve a level of cleanliness corresponding to 25 parts per million (ppm) PCBs, and replacement of the treated soil on site;

- Excavation of 3,000 cubic yards of PCB-contaminated sediments in wetland resource areas and treatment in a dechlorination unit to achieve 1 ppm PCB;
- Restoration of ground water using on-site air stripping and carbon absorption; and
- Placement of institutional controls on ground water that cannot be adequately cleaned to achieve a drinking water standard.

This remedy uses an innovative technology (i.e., dechlorination) and is expected to satisfy the CERCLA mandate for protecting human health and the environment, attaining all ARARs, and permanently reducing the toxicity, mobility, or volume of hazardous substances.

BROWNING-FERRIS INDUSTRIES (BFI) SOUTH BRUNSWICK LANDFILL SITE
SOUTH BRUNSWICK, NEW JERSEY

HRS Score: 53.42 **NPL Rank: 125**

Background

The Browning-Ferris Industries (BFI) Landfill Site is located approximately 1/2 mile northwest of Route 1 in South Brunswick, New Jersey. The landfill occupies approximately 68 acres and is surrounded primarily by wooded land, although residences and a school are located nearby. The site also is close to Heathcote Brook, a tributary of the Millstone River, which occasionally serves as a source of drinking water for the City of New Brunswick at a point 10 miles downstream.

The BFI site was a solid waste landfill for approximately 20 years before it was closed in 1978. It received municipal, hazardous, and chemical wastes and pesticides during the time it was open. BFI acquired the site from G.J. Spilatore Excavation Company in May 1973; both parties were identified as potentially responsible parties (PRPs), although BFI took full responsibility for the remediation process.

EPA conducted an investigation of the site in June 1980. In 1982, EPA and BFI entered into a three-stage Consent Order agreement to remediate the site. Phase I of the plan called for BFI to conduct a remedial investigation (RI) of the site, which was completed during 1982. The site was listed on the NPL in December 1982. Phase II of the agreement required BFI to develop a remedial plan and construct an EPA-selected remedy; BFI completed this phase between May 1983 and September 1985. Phase III required BFI to conduct a post-remedial environmental monitoring program, which BFI proposed in June 1987. Because of the Consent Order, no feasibility study (FS) was ever conducted for the site. When BFI proposed Phase III of its program, EPA developed the ROD to determine whether the remedial action selected in 1983, before the SARA amendments to CERCLA, was consistent with the new statutory requirements.

Description of Site Work

The RI conducted by BFI indicated that a shallow aquifer beneath the site was contaminated with total volatile organics (TVOs). Because some of the bedrock underlying this upper aquifer was fractured, a deeper aquifer also had become contaminated with TVOs. The RI also discovered that leachate was seeping from one side of the landfill and migrating toward Heathcote Brook.

Description of Feasibility Study

Because the PRP had developed the remedial actions, EPA did not develop a formal FS. Instead, the ROD included EPA's analysis of alternative remedial actions, in which EPA screened available technologies and identified the following nine options to be evaluated against the criteria of CERCLA:

(1) No action;

(2) Leachate collection system;

(3) Leachate collection system and clay cap;

(4) Slurry wall constructed to the depth of bedrock beneath the site;

(5) Slurry wall constructed to the depth of bedrock and clay cap;

(6) Slurry wall constructed to the depth of residual soil;

(7) Slurry wall constructed to the depth of residual soil and clay cap;

(8) Slurry wall constructed both to residual soil and to bedrock and a clay cap; and

(9) Slurry wall constructed both to residual soil and to bedrock, a clay cap, and a leachate collection system.

The analysis also identified applicable or relevant and appropriate requirements (ARARs) that remedial actions must meet. ARARs identified for this site included Resource Conservation and Recovery Act (RCRA) regulations for closure of hazardous waste landfills, the Clean Water Act (CWA) pretreatment standards for discharge to publicly owned treatment works (POTWs), and Executive Order 11990 for the Protection of Wetlands. A New Jersey State Administrative Code requirement for capping of landfills also was identified as an ARAR for the site.

The New Jersey Department of Environmental Protection (NJDEP) agreed that on-site containment of the contamination and monitoring of the site are protective of human health and the environment, and concurred with the remedy selected. Concerned citizens were informed of the remedial action and monitoring requirements of the BFI plan, and EPA held a public meeting on August 6, 1987, to explain the long-term monitoring plan and discuss the success of the constructed remedy. Overall, the public and local officials have expressed satisfaction with the selected remedy and the timeframe in which it was implemented.

Description of Selected Remedy

The remedy selected for the site in 1985 by BFI was Alternative 9, construction of a slurry wall to the depth of bedrock beneath the portions of the site where it is relatively shallow and to the depth of residual soil for the remainder of the site. The remedy also included placement of a clay cap over the site and the construction of a leachate collection system. Leachate collected at the site was treated at a nearby wastewater treatment plant. The treatment was selected on the basis of its implementability and proven effectiveness. Treatment of the hazardous waste buried at the site was not feasible because discrete areas of hazardous waste disposal could not be identified, and excavation and treatment of the entire 68 acres was determined not to be feasible. The selected remedy complies with the preference for treatments that reduce the toxicity, mobility, or volume of hazardous constituents because the leachate collection and wastewater treatment processes are reducing the amount of hazardous constituents at the site.

The evaluation of the remedial alternatives in the ROD concluded that this remedy best meets the requirements of CERCLA. The remedy was judged to be cost-effective and protective of human health and the environment. The remedy also meets Federal ARARs for capping and the pretreatment standards for discharge to POTWs. The remedy does not meet the requirements of the New Jersey Administrative Code for capping, but EPA waived this State ARAR because the selected remedy is achieving a standard of performance equivalent to that required by the State regulation.

CHEMICAL CONTROL CORPORATION SITE
ELIZABETH, NEW JERSEY

HRS Score: 47.13 **NPL Rank: 223**

Background

The Chemical Control Corporation (CCC) site is located in Elizabeth, New Jersey, on a peninsula formed by the Elizabeth River and the Arthur Kill. Despite a ban by the State of New Jersey since 1980, recreational fishing continues within 3/4 of a mile from the site, and both water bodies are used for commercial purposes.

Chemical Control Corporation operated between 1970 and 1978 and was involved in the business of hauling, treating and disposing of industrial wastes. Throughout its operations, CCC was cited for violations such as illegally discharging liquids and accumulating drums that contained incompatible wastes. In 1978, the Corporation was placed into operational receivership by the Superior Court of New Jersey. The State of New Jersey began a cleanup of the site in March 1979. The cleanup included removing solids, liquids, nearly 10,000 drums of waste, 10 pounds of infectious wastes, 7 pounds of radioactive wastes, and 24 gallons of explosive liquids. In April 1980, an explosion and fire occurred at the site that were not brought under control for more than 10 hours. After the fire, New Jersey continued its cleanup of the site by removing buildings, drums, tanks, and surface soil. The State also operated a ground-water recovery and treatment system at the site from November 1980 to July 1981.

In 1981, the site was ranked for inclusion on the Superfund Interim Priorities List. EPA has conducted two Initial Remedial Measures (IRMs) that included decontaminating and removing trailers from the site, cleaning a contaminated sewer line, and recovering containers from the Elizabeth River. A final IRM has been proposed to remove deteriorating gas cylinders from the site. Drums of waste currently remain on the site, which is surrounded by a security fence.

The EPA lead remedial investigation (RI) was completed in July 1986, and the results of the feasibility study (FS) were released in June 1987. Notice letters were sent in August 1987 to 31 parties identified as generators of the wastes or potentially responsible parties (PRPs). Informal discussions with the PRPs to reach a possible settlement continue. The ROD was signed on September 23, 1987.

Description of Site Work

Following the first two IRMs, EPA initiated an RI to determine the extent of soil, ground-water, and river contamination on the site, as well as the human health risks associated with that contamination.

The RI indicated that soil and river sediments are contaminated with organic compounds and, to a lesser degree, with metals. The RI also found low concentrations of contaminants in the ground water.

Description of Feasibility Study

The EPA lead feasibility study (FS) was completed in June 1987. The objectives for the remedial action, developed in the FS, were based on the findings of the RI. The RI identified the presence of highly contaminated soil as posing the greatest potential risk to the public health and the environment. The objective of the remedial action, therefore, was to reduce the mobility and toxicity of the contaminants in the soil, protect against human exposure to the contaminated soil, assure that leaching of contaminants from the soil will not increase, and return the site to a condition consistent with future industrial development in the area. The following eight remedial alternatives were considered:

(1) No action;

(2) Containment using a ground-water barrier;

(3) *In situ* soil washing with a ground-water barrier;

(4) *In situ* soil fixation;

(5) Excavation and off-site disposal to a landfill;

(6) Excavation, on-site treatment, and off-site disposal;

(7) Excavation, on-site treatment, and on-site disposal; and

(8) Excavation, off-site incineration, and disposal.

Evaluation of the alternatives considered applicable or relevant and appropriate requirements (ARARs), and also considered the utilization of permanent solutions and alternative treatment technologies. Federal and State ARARs identified included Executive Order 11988 for Management of Floodplains and discharge limits for surface-water protection. Another ARAR was the Endangered Species Act because the surface water near the site is within breeding range of the endangered short-nosed sturgeon. New Jersey has indicated that State ARARs will be satisfied if a bioassay is performed, and if contaminants in the soil are found not to exceed State guidelines. Resource Conservation and Recovery Act (RCRA) regulations were not considered applicable because the site did not operate under a permit issued pursuant to that act. However, the selected remedy was evaluated for compliance with RCRA, as relevant and appropriate, by considering the hypothetical situation of a site similar to Chemical Control that was operated under a permit.

Input received during the public comment period was considered in the decision. Community concern began in 1977 when citizens and local officials complained about the site. The main concern of local officials is that a thorough, permanent remedy be implemented expeditiously.

Description of Selected Remedy

The selected remedy is the *in situ* soil fixation alternative (Alternative 4) that includes repairing berms on the site, removing debris, sealing the sewer line, and monitoring to evaluate the effectiveness of the remedy. *In situ* fixation of the soil meets CERCLA requirements to reduce the mobility of toxicants, provide a permanent and long-term solution, and use an alternative treatment technology that offers a cost-effective remedy. The on-site operation may temporarily violate Executive Order 11988 for the Management of Floodplains while equipment is located on the site. Both the Department of Commerce and the Agency for Toxic Substances and Disease Registry concurred that the selected remedy offers adequate protection of public health.

COOPER ROAD DUMP SITE
VOORHEES TOWNSHIP, NEW JERSEY

HRS Score: 36.79 **NPL Rank: 473**

Background

The Cooper Road Dump site is located in Voorhees Township in the north central part of Camden County, New Jersey. The dump encompasses a surface area of less than 100 square feet. The area around the site is being developed for residential use, with the closest house within 300 feet of the site. Aquifers supplying drinking water underlie the site and there are several potential surface-water discharge points from the aquifer in the vicinity.

Contamination was discovered in mid-1982 when several dozen broken and sealed small glass vials containing liquid chemicals were found partially buried in a soil pit area. An analysis of the vials by the New Jersey Department of Environmental Protection (NJDEP) indicated the presence of hazardous substances, including benzene, xylene, and naphthalene. The NJDEP subsequently ordered the owner of the property to remove the hazardous materials but no reply was received.

A surface cleanup was completed in May 1984 by a new site owner, the Cinamerican Company, during which all the vials and soils to a depth of 6 inches below any vials were removed. Although no further soil contamination was revealed, the site was placed on the final NPL in November 1984 for determination by EPA as to whether there had been a release of contaminants into the underlying soils or ground water. In September 1986, EPA and the NJDEP agreed to conduct sampling at the site, and the sampling reports were completed in August and September 1987. The ROD was signed September 30, 1987.

No additional enforcement actions are anticipated because the generators of the vials have not been located, the vials appear to have been dumped without the knowledge of the previous or current property owners, and the current property owner completed a surface cleanup to the satisfaction of EPA.

Description of Site Work

Results of the soil and ground-water sampling in April 1987 revealed certain contaminants at concentrations above background levels. However, because contamination was found at the laboratory where the samples were analyzed, the validity of the sampling studies was called into question. Further EPA testing revealed no contaminants in concentrations that would produce any adverse health effects, based on Federal and State guidelines and criteria. The risk assessment in the remedial investigation (RI) determined that there was no potential exposure to contamination.

Description of Feasibility Study

Because the field investigations indicated no contamination, no potentially feasible remedial actions were evaluated. It was also determined that no monitoring of the shallow underlying aquifer was necessary.

Applicable or relevant and appropriate requirements (ARARs) identified for the ground water at the site were EPA's Maximum Contaminant Levels (MCLS) under the Safe Drinking Water Act (SDWA), and NJDEP'S Interim Action Levels for Selected Organics in Drinking Water. Action levels for certain metals in soil have been developed by NJDEP and were used as ARARs. No contaminants exceeded ARARs.

Community involvement was solicited at the conclusion of the RI and a public meeting was held in September 1987. Town officials and citizens who live in the vicinity of the site attended the meeting. Since the discovery of the site in 1982, community concern has focused on potential health effects of community exposure, potential adverse effects on housing values, and the timing of the removal of the site from the NPL.

Description of Selected Remedy

The remedy selected for the site calls for no further action. The remedy is considered to comply with ARARs, to be cost-effective, and to be protective of human health and the environment.

DIAMOND ALKALI SITE
(ALSO KNOWN AS DIAMOND SHAMROCK SITE)
SOURCE CONTROL OPERABLE UNIT
NEWARK, NEW JERSEY

HRS Score: 35.40 **NPL Rank: 523**

Background

The Diamond Alkali Site (also known as the Diamond Shamrock Site) is located in Newark, New Jersey, along the Passaic River. The 3.4-acre site has been used for industrial purposes since the 1870s. From 1951 to 1969, the Diamond Alkali Company (subsequently known as the Diamond Shamrock Chemicals Company) manufactured DDT and other chemicals on the site, including sodium trichlorophenol (TCP). After 1969, the site was owned or leased by several companies.

During 1983, as a result of EPA's strategy to inspect all sites known to have produced TCP, the site was sampled for dioxin contamination. The tests showed that dioxin contamination was present, and in March 1984, the New Jersey Department of Environmental Protection (NJDEP) issued an Administrative Order to Diamond Shamrock to conduct a remedial investigation/feasibility study (RI/FS). The site was listed on the NPL in September 1984 and Diamond Shamrock completed the RI/FS in December 1985.

EPA and NJDEP divided the site into operable units based on the results of the RI conducted by Diamond Shamrock. The first operable unit addressed source control and remediation of ground water. EPA made public a proposed remedial action plan in July 1987. After responding to public comments, the ROD for the first operable unit was signed in September 1987. Subsequent operable units may address remediation of ground-water contamination, and the remediation of the sediments of Passaic River.

Description of Site Work

Diamond Shamrock completed the RI in May 1985 under the supervision of the NJDEP. The RI included sampling of air, ground water, soil, surface water, buildings on the site, storage drums, and off-site properties. The RI indicated that the site was contaminated by a large number of hazardous substances, and that the greatest risks were posed by DDT and dioxin. The pathways of exposure determined to cause risk included: migration of hazardous substances to surface water and sediments of the Passaic River; migration of airborne hazardous substances from volatilization and dust generation; and migration of hazardous substances into the ground water.

Description of Feasibility Study

The FS for the first operable unit evaluated remedial alternatives for source control, including the prevention of further releases of hazardous substances to the Passaic River. Seven remedial alternatives were developed:

(1) No action;

(2) On-site containment of wastes with a cap and slurry wall;

(3) On-site containment of wastes with a cap and slurry wall and ground-water treatment;

(4) Excavation of wastes and on-site thermal destruction, containment of remaining wastes with a cap and slurry wall, and on-site ground-water treatment;

(5) Excavation of wastes and construction of an on-site vault encapsulating all wastes and on-site ground-water treatment;

(6) Excavation of wastes and off-site disposal, containment of remaining wastes with a cap and slurry wall, on-site ground-water treatment, and decontamination of buildings; and

(7) Excavation of wastes and off-site thermal treatment, containment of remaining wastes with a cap and slurry wall, on-site ground-water treatment, and decontamination of buildings.

Description of Selected Remedy

The remedy selected was similar to Alternative 3 of the FS, on-site containment of wastes with a cap and slurry wall and on-site ground-water treatment. The remedy was expanded to include protection against floods with the construction of a flood wall, off-site removal of certain drums located on the site, and requirement for a follow-up FS every 2 years.

The remedy is expected to attain all ARARs except the three that were waived in accordance with CERCLA section 121(d)(4)(B), that allows a waiver from meeting an ARAR when attaining the ARAR will result in a greater risk to human health or the environment. ARARs not met for this reason were RCRA land disposal restrictions and landfill design requirements, and State landfill design requirements.

The remedy is expected to be protective of human health and the environment consistent with the requirements of CERCLA. The State of New Jersey was consulted and concurred with the selected remedy.

MONTGOMERY TOWNSHIP HOUSING DEVELOPMENT SITE ALTERNATE WATER SUPPLY OPERABLE UNIT MONTGOMERY TOWNSHIP, NEW JERSEY

HRS Score: 37.93 **NPL Rank: 438**

Background

The Montgomery Township Housing Development (MTHD) site is a 72-acre tract of land located in Montgomery Township, New Jersey, 15 miles northeast of Trenton. There are 77 homes located on the site. Each home has its own drinking water well that draws water from the Brunswick Formation aquifer that underlies the site. Ground water in the Brunswick formation is also used for industrial purposes.

In 1978, a Rutgers University study of the Rocky Hill Borough well, which is located nearby but not within the MTHD, revealed that the well was contaminated with trichloroethene (TCE). In 1979, after continued testing of this water supply indicated greater TCE concentrations, the New Jersey Department of Environmental Protection (NJDEP) began sampling commercial and domestic wells in Montgomery Township. Included in the NJDEP sampling program were private wells, industrial supply wells, soils, surface waters, and septic tanks. In August 1980, Montgomery Township authorized the installation of Elizabethtown Water Company (EWC) water mains in the MTHD, and residents were advised not to use well water. As of September 1987, 38 residential wells had been connected to water mains.

In 1984, NJDEP entered into a cooperative agreement with EPA under which NJDEP would perform the remedial investigation/feasibility study (RI/FS) for the MTHD and Rocky Hill Municipal Well (RHMW) sites. Because of the proximity of the sites, and the similarity of the contaminants found, NJDEP performed the RI/FS for the two sites under one cooperative agreement. Due to the potential health risks posed by the possible consumption of contaminated ground water, EPA designated as an operable unit the provision of an alternate water supply for the 120 residents of the MTHD with private drinking water wells. The State lead RI/FS for this operable unit was completed in July 1987, and the ROD was signed in September 1987. Remediation of the aquifer will be addressed in a subsequent operable unit ROD.

The NJDEP has not been able to identify the precise source of the TCE contamination, although several industrial and commercial establishments within the site area, including an industrial research facility, are believed to be potential sources. There is no conclusive evidence, however, connecting these PRPs to the TCE contamination.

Description of Site Work

The NJDEP separated the joint-site RI/FS into two phases. Phase 1, the geohydrologic investigation, was completed in January 1987. The objective of this phase was to characterize and determine the boundaries of the ground-water contaminant plume. Results indicated the ground water was contaminated with TCE, at levels up to 650 ppb, and with other volatile organic compounds. The

TCE-contaminated ground-water plume, which appears to have been in a steady condition for at least the past 8 years, threatens an area of approximately 25,000 square feet. The RI, however, could not precisely determine the extent of the plume.

The second phase of the RI is continuing and is attempting to better define the contaminant plume. Remediation of the aquifer will be evaluated in a subsequent FS.

Description of Feasibility Study

The State lead FS for the alternative water supply operable unit addressed the health risks to the 120 MTHD residents who continue to utilize contaminated or threatened private wells. The following remedial alternatives were developed:

(1) No action, except for ground-water monitoring;

(2) Temporary provision of bottled water to residents (for 2 to 12 years);

(3) Extension of the EWC Distribution System to allow for service connections to all threatened residents, and closure of individual residential wells; and

(4) Construction of a new centralized community well and treatment of well water.

New Jersey Maximum Contaminant Levels (MCLs) and Safe Drinking Water Act (SDWA) MCLs were determined to be applicable or relevant and appropriate requirements (ARARs) at this site. Drinking Water Health Advisories and reference levels for carcinogens are not enforceable requirements, but were considered in the analysis of remedial alternatives.

MTHD residents showed concern about the site, particularly about the quality of EWC water. However, EPA and NJDEP have confirmed that this water supply consistently is in compliance with State and Federal water quality standards. Several residents also expressed reservations about the permanent sealing of their private wells because of the expense of using EWC water. Additionally, the Township and a number of residents believe that some residents have been compensated insufficiently in the past for the costs of service connection installations. EPA responded that Superfund is not used for reimbursement programs, and that future reimbursement of residents is an issue for the State.

Description of Selected Remedy

The alternative selected for this operable unit (Alternative 3) included extending the EWC Distribution System, providing service connections to all residents currently using wells that are or could be contaminated, and sealing individual contaminated wells. This remedy represents the first operable unit of a permanent remedy for the MTHD/RHMW sites. Identification of sources of contamination and possible remediation of the ground-water plume will be addressed in a subsequent ROD.

The chosen remedy is the most cost-effective solution, is expected to attain ARARs, is implementable and technically feasible, and will provide a permanent solution to the problem of potential exposure of MTHD residents to contaminated ground water.

RENORA, INC., SITE
EDISON TOWNSHIP, NEW JERSEY

HRS Score: 40.44 **NPL Rank: 378**

Background

The Renora, Inc., site, located in Edison, New Jersey, comprises one acre of land in an area zoned for light industry. A small commercial complex is adjacent to the site, and a residential area, containing a nursery school, a senior citizens' center, and an apartment complex, lies nearby. All ground water from the site discharges into Mill Brook, which borders the site.

Between 1978 and 1982, the site was used by Renora for storage, and ultimately disposal, of materials containing hazardous substances. An inspection of the site by the New Jersey Department of Environmental Protection (NJDEP) in 1978 detected minor spills. A subsequent spill prompted NJDEP and the Edison Township Department of Health and Human Resources (DOH) to investigate the site, resulting in an order to remove all contaminated soil and drums. In 1980, the NJDEP ordered Renora to cease all operations and implement remedial actions at the site. Although Renora and the NJDEP agreed on a site cleanup schedule shortly thereafter, Renora stopped cleanup activities due to lack of funds. Renora abandoned the site in June 1982 and EPA included it on the NPL 6 months later.

In 1984, EPA issued to all known potentially responsible parties (PRPs) an administrative order to cleanup the site. A removal action, conducted by PRPs between October 1984 and April 1985, removed liquid containerized wastes, PCB-contaminated waste oil, and visibly contaminated soils. The PRPs conducted a remedial investigation/feasibility study (RI/FS) of the site between May 1985 and May 1987 under EPA oversight. In support of the RI/FS, EPA conducted an endangerment assessment to determine risks posed by the site. Based on discussions following completion of the FS, the PRPs appeared to be willing to implement the selected remedy. The ROD was signed on September 29, 1987.

Description of Site Work

Results of the RI indicated that the bulk of contamination at the site is in the soil. Surficial soils (0-2 feet) contain PCBs, polyaromatic hydrocarbons (PAHs), and to a lesser extent, volatile organic compounds (VOCs) and heavy metals. Shallow ground water beneath the site is contaminated with low levels of the VOC chloroethane and heavy metals. Surface-water and sediment samples show levels of heavy metals, tetrachloroethane, and pesticides. However, contaminant levels in upstream and downstream surface water and sediment samples were not significantly different.

EPA's endangerment assessment revealed that the most significant threat to human health is the possibility of direct contact with contaminated soils. Trespassers, on-site workers, and future residents of the property are at the highest level of risk.

Description of Feasibility Study

To address site contamination, EPA evaluated eight alternative remedial action approaches on the basis of effectiveness, implementability, cost, and compliance with other CERCLA mandates. EPA chose the following alternatives for evaluation:

(1) No action, with periodic ground-water monitoring;

(2) Capping the site, with periodic ground-water monitoring;

(3) Excavation of PCB-contaminated soils, partial excavation of PAH-contaminated soils, off-site disposal, and ground-water monitoring;

(4) Excavation of PCB-contaminated soils and off-site disposal, partial excavation and biodegradation of PAH-contaminated soils, and ground-water monitoring;

(5) Excavation of PCB-contaminated soils and off-site disposal, and excavation and biodegradation of PAH-contaminated soils;

(6) Excavation of PCB- and PAH-contaminated soils and off-site disposal, slurry wall installation, and ground-water pumping and on-site treatment;

(7) Excavation of PCB-contaminated soils and off-site disposal, excavation and biodegradation of PAH-contaminated soils, and slurry wall installation; and

(8) Excavation and off-site disposal of all contaminated soils, slurry wall installation, ground-water pumping, and on-site treatment.

The alternatives were evaluated according to the extent to which they attain Federal and State applicable or relevant and appropriate requirements (ARARs). Remedial actions such as excavation, treatment, and disposal of waste are subject to a number of requirements under the Resource Conservation and Recovery Act (RCRA). Ground-water contaminant levels are regulated under the Safe Drinking Water Act (SDWA) and New Jersey Ground-water Standards. State criteria, advisories, and guidance governing the soil contaminants, PCBs, and PAHs, although not strictly ARARs, were utilized in the remedy selection process.

In choosing an appropriate remedy, EPA tried to maximize public and State involvement. "Public acceptance" and "State acceptance" were two criteria used to evaluate each alternative. EPA held a comment period in the fall of 1987 and a public meeting on September 1, 1987, to address questions concerning the remedial alternatives.

Description of Selected Remedy

After considering the eight alternatives, EPA selected Alternative 5, which involved excavation of PCB-contaminated soils, biodegradation of PAH-contaminated soils, and use of ground water as an irrigation medium in the bioremediation system. Excavation of PCB-contaminated soils is expected to reduce PCBs to targeted treatment levels, providing a permanent reduction in the volume of contaminants to the maximum extent practicable. Remaining contaminants will be subject to bioremediation, which is considered an innovative technology. Implementation of the bioremediation system will significantly and permanently reduce the toxicity, volume, and mobility of the remaining contaminated soil at the site. The selected remedy is expected to attain ARARs.

WALDICK AEROSPACE DEVICES SITE
SOURCE CONTROL OPERABLE UNIT
WALL TOWNSHIP, NEW JERSEY

HRS Score: 44.86 **NPL Rank: 271**

Background

The Waldick Aerospace Devices site is an inactive industrial facility located in Wall Township, Monmouth County, New Jersey, 60 miles northeast of Philadelphia. From 1979 to 1984, Waldick Aerospace Devices, Inc., manufactured and plated metal components at the 1.75-acre site. Based on a referral from a former Waldick employee, the New Jersey Department of Environmental Protection (NJDEP), the Monmouth County Division of Criminal Justice (MCDCJ), and the Monmouth County Board of Health (MCBH) conducted an initial inspection of the facility in June 1982. This inspection revealed that Waldick was discharging wastewater containing heavy metals, organic solvents, and oil products directly onto the ground around the main manufacturing building. In addition, 2,100 square feet of soils at the rear of the plant appeared to be saturated with oil, and 30 to 40 drums were scattered across the site.

In October 1982, NJDEP ordered Waldick Aerospace to clean up the site. In January 1983, under the supervision of NJDEP, the company installed four on-site monitoring wells. Subsequent sampling in early 1983 indicated that soil and ground water were contaminated with heavy metals and organic compounds. In June 1983, Waldick removed 80 cubic feet of visibly contaminated soil and stored the excavated material on a polyethylene membrane until it was disposed of off site in 1984.

In March 1984, the State prosecuted Waldick Aerospace and its sister company, KLS Industries, for criminal violation of Federal and State environmental laws. The court ordered both corporations to pay all financial obligations rendered and to clean up the site by September 1984. In October 1984, MCBH inspectors observed that, despite the removal of the pile of excavated material and drums, the ground water below the site had become contaminated with cadmium at levels 300 to 1,200 times higher than National Primary Drinking Water Standards. MCBH recommended additional downgradient excavation and another round of soil samples; to date, KLS has neither responded to MCBH requests nor taken further remedial actions.

MCBH identified and notified five other potentially responsible parties (PRPs), but none has chosen to become involved in any remedial activities. In November 1985, EPA initiated a remedial investigation/feasibility study (RI/FS) to identify source control remedial alternatives. Off-site migration of contaminants will be addressed in a future operable unit. The RI/FS for the source control operable unit was completed in July 1987, and the ROD was signed in September 1987.

Description of Site Work

The EPA lead RI revealed three distinct areas of contamination in the soils along the west, south, and east sides of the buildings. EPA designated the western areas as Area 1, and the southern and eastern areas as Area 2. Area 1 was contaminated mainly with volatile organic compounds (VOCs) and petroleum hydrocarbons (PHCs); Area 2 contained high levels of cadmium and chromium, as well as VOCs and PHCs. Contaminant pathways for the soil contaminants include overland flow, ground-water flow through an aquifer beneath the site to a nearby brook, and direct contact with soil. The brook is known to be contaminated with a wide variety of compounds, but the RI could not determine the extent of the contaminated ground-water plume.

Although the RI examined all contaminated media, only the soils and buildings could be characterized sufficiently to proceed with the FS. EPA decided to address these sources of on-site contamination in a source control operable unit.

Description of Feasibility Study

To mitigate contamination of on-site soil and buildings the FS developed the following remedial alternatives:

(1) No action;

(2) Improvement of site security, and monitoring of ground water;

(3) Containment of contaminated soil with a slurry wall and surface cap;

(4) *In situ* air stripping of Area 1 and excavation and vitrification of Area 2;

(5) *In situ* air stripping of Area 1 and excavation and incineration of Area 2;

(6) *In situ* air stripping of Area 1 and excavation, removal, and off-site disposal of Area 2; and

(7) *In situ* air stripping before excavation and removal of contaminated soils in Areas 1 and 2 for off-site disposal.

The applicable or relevant and appropriate requirements (ARARs) identified for the site include the Coastal Zone Management Act and Resource Conservation and Recovery Act (RCRA) land disposal restrictions. Because neither Federal or State contaminant-specific ARARs for soils have been established, NJDEP cleanup objectives will be utilized as the soil standards for the site.

EPA held a public meeting in 1985, to present the RI/FS work plan, and in 1987, to present the results of the RI/FS. EPA also conducted numerous informal meetings to inform the public of the site's history and its current status.

Description of Selected Remedy

The source control operable unit remedy selected for the site (a modification of Alternative 5) included the following actions:

- *In situ* air stripping treatment of contaminated soils, and excavation and off-site disposal of all treated soils with residual contamination above action levels;
- Appropriate remediation of on-site buildings by decontamination or demolition; and
- Installation of additional ground-water monitoring wells, environmental monitoring, site fencing, and well restrictions.

Ground water, surface water, and stream sediments will be addressed in a future operable unit, which will focus on the off-site migration of contaminants.

The local community is in agreement with the source control action; some residents expressed concern about their drinking water and whether the buildings would be safe for occupancy after decontamination. EPA assured residents that ground-water investigations would continue, and that decontamination procedures were expected to make the buildings safe for future use.

WILLIAMS PROPERTY SITE
MIDDLE TOWNSHIP, NEW JERSEY

HRS Score: 40.45 **NPL Rank: 377**

Background

The Williams property site is located in Middle Township, Cape May County, New Jersey, 60 miles southeast of Philadelphia. The 5.6-acre tract of wooded land contains a well and a single residence owned by the Williams family. Widespread dumping of refuse and construction debris has been occurring at the site for an unknown period of time. In August 1979, approximately 150 drums of liquid chemical wastes and sludge were emptied on the property adjacent to the Williams residence. In response, the New Jersey Department of Environmental Protection (NJDEP) undertook extensive investigations to determine the environmental impact of the spill. These investigations revealed that surficial sludge, underlying soil, and ground water were contaminated with organic chemicals.

During June 1980, NJDEP initiated an emergency cleanup of the spill site, removing 1,200 cubic yards of sludge and soil. Subsequent domestic-water monitoring revealed little or no evidence of contamination until 1984, when contaminant levels in a well at the Williams site increased sharply. The county health department subsequently closed the well. The residents located near the Williams property have been provided with municipal water, and the private wells at these homes are no longer in use.

Two potentially responsible parties (PRPs) identified for the site included the property owner and the generator of the hazardous substances. The property owner is not financially viable, and NJDEP could not reach an agreement with the generator to conduct the remedial investigation/feasibility study (RI/FS). Through a cooperative agreement with the EPA, NJDEP completed an RI/FS for the site in July 1987. The ROD for the site was signed September 30, 1987.

Description of Site Work

The State lead RI revealed a plume of organic contaminants in the ground water beneath the site. The plume originated from the area of the 1979 spill, although the RI revealed that the 1979 spill was not the only source of plume contaminants. The plume extended 600 feet to the northeast in the Holly Beach Aquifer. Because the ground-water plume was migrating (at a rate of 90 to 200 feet per year), the concentration of contaminants was increasing at downgradient wells and decreasing at upgradient wells. The population threatened by exposure to the contaminated plume included all downgradient private well users not supplied with city water. Downgradient homes in the immediate vicinity of the site had been connected to a municipal water supply.

The top 2 feet of soil at the site also was found to be contaminated with phthalate, tetrachloroethane, and xylene at levels exceeding New Jersey soil cleanup criteria. Populations at risk of exposure from direct contact with the soil included nearby residents and visitors. The RI estimated that the permanent population within 1 mile of the site was 485, with a peak summer campground population of 4,738.

Description of Feasibility Study

Based on the results of the RI, the State lead FS identified the following remedial response objectives: (1) remediate and mitigate migration of contaminated ground water; (2) mitigate leaching of contaminated soil into ground water; and (3) prevent direct contact with contaminated soil. Technologies were selected and screened based on CERCLA criteria and site-specific conditions. The following alternatives, in addition to a "no action" alternative and institutional controls alternative, were developed and retained for detailed analysis:

(1) **Ground-water remedial alternatives:**

- Extraction, air stripping, and recharge;
- Extraction, carbon adsorption, and recharge;
- Extraction, air stripping, carbon adsorption, and recharge;
- Extraction, air stripping, carbon adsorption, precipitation, flocculation, sedimentation, and recharge;
- Extraction, air stripping, precipitation, flocculation, sedimentation, and recharge;
- Extraction, carbon adsorption, precipitation, flocculation, sedimentation, and recharge; and
- Extraction, air stripping, carbon adsorption, ion exchange, and recharge.

(2) **Soil remedial alternatives:**

- Excavation, disposal in off-site permitted landfill, surface grading, and revegetation;
- Excavation, disposal in on-site landfill, surface grading, and revegetation;
- Installation of vacuum extraction well and soil vacuuming system;
- Excavation, off-site incineration, surface grading, and revegetation;
- Excavation, on-site incineration, surface grading, and revegetation; and
- *In situ* destruction.

Federal applicable or relevant and appropriate requirements (ARARs) identified for the site included Resource Conservation and Recovery Act (RCRA) air emission standards and Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs). State ARARs included ambient air quality standards, volatile organic substance standards, air stripping permitting requirements, and ground-water and soil treatment standards.

In public meetings held concerning RI/FS results, the local community expressed no strong positive or negative feelings about any of the remedial alternatives, but were concerned mainly about the time required for site cleanup. There was virtually no criticism of the selected remedy.

Description of Selected Remedy

The remedy selected for the site included the following activities:

- Ground-water extraction, treatment by air stripping and carbon adsorption, and discharge to the aquifer; and
- Soil excavation and off-site incineration, site restoration, and provision of an alternate water supply for the Williams residence.

This remedy represented a permanent solution for the site and protects human health by removing the contaminants from the ground water and removing any residual source of continuing contamination from the site. The remedy is cost-effective and is expected to attain ARARs.

ENDICOTT VILLAGE WELL FIELD SITE
ALTERNATIVE WATER SUPPLY OPERABLE UNIT
VILLAGE OF ENDICOTT, NEW YORK

HRS Score: 35.57 **NPL Rank: 507**

Background

The Endicott Village Well Field is located in the Village of Endicott in Broome County, New York. The site consists of a well and associated ground-water contamination. The well field site is located near industrial tracts and landfills including Endicott landfill, which was identified as the probable source of contamination. No private homes are located in the site area.

The well operated from 1950 to the present, drawing water primarily by infiltration from the nearby Susquehanna River. Currently, the well delivers approximately 47 percent of the total water supply to the Endicott municipal system. In May 1981, following a chemical spill in Endicott, EPA sampled wells and detected vinyl chloride and trace amounts of other volatile organic contaminants (VOCs) in the well water. The Public Works Department for the Village of Endicott undertook several site remediation efforts, including installation of an aeration system and a purge well to capture the contaminant plume. Despite the remediation efforts, the Maximum Contaminant Level (MCL) for vinyl chloride has been exceeded in ground-water discharge on several occasions.

Because of the threat to drinking water supplies, EPA initiated remedial actions as an operable unit to provide safe drinking water to the community. The EPA lead remedial investigation/feasibility study (RI/FS) for this operable unit was completed in July 1987 and the ROD was signed September 25, 1987. A supplemental RI/FS for a second operable unit has been initiated to evaluate the nature and extent of contamination, to evaluate possible source control measures, and to further investigate source areas and companies that have been identified as contributing hazardous waste to the Endicott landfill. Notice letters will be sent out to potentially responsible parties (PRPs) after the supplemental RI/FS, as appropriate.

Description of Site Work

The primary objective of the RI for the first operable unit was to identify the source of contamination to the well. The RI indicated that the most probable source was the landfill, particularly when inundated by the Susquehanna River during floods. The primary potential human health impact at the site was through ingestion of contaminated ground water. Contaminants of concern were determined to be various organic compounds. Of these chemicals, only vinyl chloride was occasionally present at levels exceeding applicable or relevant and appropriate requirements (ARARs) for the site.

Description of Feasibility Study

The objective of the FS for the first operable unit was to develop short-term remedial alternatives capable of providing a safe drinking-water supply to the community. Seven alternatives were developed and evaluated against criteria mandated by CERCLA:

(1) No action;

(2) Installation of purge wells only;

(3) On-site treatment of ground water via air stripping and discharge to the distribution system of the Village of Endicott;

(4) Alternative 3 with additional purge wells;

(5) Installation of a new Endicott supply well;

(6) Construction of a new treatment plant; and

(7) Connections to the surrounding community supply.

As mandated by CERCLA, remedies must use permanent solutions and treatment technologies to the maximum extent practicable, and must also attain ARARs. ARARs identified for the site include the MCL for vinyl chloride and the Federal Water Quality Criteria for the other VOCs. Other ARARs include New York State guidelines for air emissions from air strippers, and the National Emission Standard for Hazardous Air Pollutants (NESHAPS) for vinyl chloride.

The remediation efforts conducted at the site by community officials has reduced the level of public concern over the contamination at the well. A public meeting was held on August 11, 1987, to discuss the results of the RI/FS.

Description of Selected Remedy

The remedy selected for the site (Alternative 3) consists of four components:

- Treatment of the ground water, by means of air stripping, and subsequent discharge of the treated water to the distribution system of the Village of Endicott for use as drinking water;
- Continued operation of the purge well by the Village;
- Continued monitoring for VOCs by the Village; and
- Initiation of a supplemental RI/FS with the New York State Department of Environmental Conservation (NYSDEC) as lead agency.

The selected remedy is designed as a short-term remedial measure operable unit and utilizes an alternative treatment technology to the maximum extent practicable. The selected remedy is expected to be protective of human health and the environment, to be cost-effective, and to attain all Federal and State ARARs.

G.E. MOREAU SITE
MOREAU, NEW YORK

HRS Score: 58.21 **NPL Rank: 52**

Background

The GE Moreau site in Moreau, New York, 30 miles north of Albany, was used as an industrial waste disposal site from 1958 to 1968. An evaporative pit at the site received approximately 452 tons of waste material generated by the General Electric (GE) Company, including trichloroethylene (TCE), PCBs, spent solvents, oils, sludges, and other miscellaneous waste. The site was included in a September 1980 Consent Order with the New York State Department of Environmental Conservation (NYSDEC) whereby GE would conduct investigations at seven waste disposal sites in the area and contain the waste materials at these sites.

In late 1982, it was determined that there were elevated levels of TCE in the ground water at the site. As a result, the Town of Moreau installed activated carbon filter systems on the drinking water systems of 70 homes believed to be downgradient from the site. In the summer of 1983, EPA negotiated with GE to address the off-site contamination problems. These negotiations resulted in the signing of an Administrative Order in November 1983, under which GE agreed to: 1) install and maintain activated carbon filter systems on homes whose well contamination exceeded specified levels; 2) sample and analyze on a monthly basis drinking water in homes downgradient from the site on a monthly basis until full remediation is completed; 3) conduct a remedial investigation/feasibility study (RI/FS); 4) design and construct the EPA-selected remedy; and 5) conduct post-remediation monitoring and operation and maintenance. GE's RI/FS was completed in August 1985 and the resulting ROD was signed September 25, 1987.

Description of Site Work

The RI conducted by GE consisted of a complete characterization of the aquifer, including ground-water flow and contaminant transport phenomena. The RI indicated that a contaminant plume approximately 4,800 feet long and up to 2,000 feet wide of volatile organic compounds (VOCs) emanated from the site. The plume originated at the GE Moreau site and followed the regional ground-water flow, extending to surface-water streams feeding the New Reservoir. TCE was the most prevalent organic contaminant, found at levels up to 81 ppm. The RI also showed TCE and dichloroethylene contamination (up to 900 ppb) in Reardon Brook, which feeds public water supply reservoirs of a nearby town. The RI also identified 8,600 cubic yards of PCB-contaminated soils in the dirt roads leading to the GE Moreau site.

Description of Feasibility Study

The primary purpose of the FS was to identify remedies that would ensure a safe drinking water supply for residents whose drinking water wells had been adversely impacted by ground-water contamination emanating from the site. Other objectives of selected remedies would include remediating the water quality of Reardon Brook and reducing the potential for exposure to PCB-contaminated soils adjacent to the GE Moreau site. Based on these objectives, the following remedial alternatives were developed:

(1) **Surface-water Supply:**
- Activated carbon adsorption; and
- Air stripping;

(2) **Residential Water Supply:**
- No action;
- Ground-water monitoring only;
- Ground-water pumping and recharge;
- Individual whole house treatment; and
- Provision of an alternate water supply;

(3) **Aquifer Restoration:**
- Source containment, ground-water monitoring, air stripping, and discharge; and
- Source containment, and ground-water pumping and recharge;

(4) **Soil Remediation:**
- Excavation and on-site soil disposal;
- Excavation and off-site soil disposal; and
- Surface sealing of soils.

CERCLA requires that selected remedies attain applicable or relevant and appropriate requirements (ARARs). The ROD identified several Federal and State requirements only as "relevant and appropriate," including Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs), and New York State Ambient Water Quality Standards and guidance values.

EPA conducted numerous meetings with citizens groups and public officials. The Town Board of Moreau requested that EPA require a new or modified RI/FS report, on the basis that the report was inadequate in three areas: the provision of alternative water sources; the definition of the contaminated area; and the restoration of the aquifer. The town asserted that the plume emanating from the site had migrated from the area defined as "contaminated" by the RI/FS. EPA informed the town that the contaminated areas had been defined properly. The Town of Moreau never shared any evidence of the alleged plume migration, and EPA never revised the mapping of the plume. EPA is completely satisfied with the results of the RI/FS report prepared by GE and adopts it as conclusive.

Description of Selected Remedy

The selected remedy for the site included the following actions:

- Treating Reardon Brook waters through air stripping;

- Providing an alternative water supply for residences with potentially contaminated drinking water wells;

- Restoring the aquifer through source containment, ground-water monitoring, air stripping, and discharge; and
- Excavating PCB-contaminated soil and storing the soil onsite behind an existing slurry wall.

These activities are expected to be consistent with the technical requirements of both State and Federal environmental laws, are cost-effective, and provide adequate protection of public health, welfare, and the environment.

HAVILAND COMPLEX SITE
TOWN OF HYDE PARK, NEW YORK

HRS Score: 33.62 **NPL Rank: 607**

Background

The Haviland Complex site is located in the Town of Hyde Park in Dutchess County, New York. The 275-acre site includes an apartment complex, an elementary school, a shopping center, and a number of private residences. There are residential and non-residential wells on the site whose water is drawn from an aquifer that underlies the site.

The Haviland Complex Apartments were constructed in the 1960s, in proximity to an existing shopping center and local residences. The shopping center contains a laundromat and dry cleaner, both of which have been in business since the 1960s. Complaints about the quality of ground water from apartment residents began in October 1981. Allegations about a failure of the laundromat's sewage disposal system were the impetus for Dutchess County and the New York State Department of Environmental Conservation (NYSDEC) to begin testing the quality of the ground water at the site. These tests indicated that the sewage systems of the dry cleaner and of a nearby car-washing business had deteriorated and that these systems were at least contributing to the site's ground-water problems.

NYSDEC conducted further tests in 1982 because of the concern about potential contamination of ground water with volatile organic compounds (VOCs) from the laundromat's sewage system. As a result of this testing, NYSDEC recommended that the City disconnect its public water system from a well near the apartment complex, and that the laundromat implement a pretreatment system. In June 1985, NYSDEC asked EPA to perform a removal action to provide all residents with potable water. EPA declined to conduct a removal action because the site did not meet the necessary criteria (specifically, because contamination levels at the site did not exceed EPA's 10-day Health Advisory levels for drinking water). EPA listed the site on the NPL in October 1985 and in August 1986 began a remedial investigation/feasibility study (RI/FS) of source control options and of providing an alternative water supply. The ROD was signed September 30, 1987.

Description of Site Work

The New York State lead RI indicated that the source of contamination was broader than the NYSDEC tests indicated, and appeared to include several septic systems in the area, including those of businesses connected to the Haviland Shopping Center (e.g., car wash and laundromat), Haviland Complex Apartments, and the Haviland Junior High School. The primary environmental exposure routes of chemical contamination at the site were drinking ground water and inhaling VOCs while showering. Vinyl chloride was the contaminant that presented the highest potential risk to public health.

Description of Feasibility Study

The objective of the FS was to evaluate and recommend a cost-effective remedial action that would minimize the risk to public health and the environment and meet the statutory requirements of CERCLA. Remedial action alternatives were subjected to a preliminary screening based on technical feasibility and other criteria. Of the original 11 alternatives, 5 remained after the screening:

(1) No action;

(2) Source control, including excavation of contaminated dry wells and septic disposal systems;

(3) Ground-water extraction, treatment, and discharge to surface waters;

(4) Ground-water extraction, treatment, and discharge to public water supply; and

(5) Provision of public water supply to all private well users in the study area.

The FS also identified potential applicable or relevant and appropriate requirements (ARARS) that the remedial action must meet as mandated by CERCLA. Federal ARARs included Maximum Contaminant Levels (MCLs) established under the Safe Drinking Water Act (SDWA), ambient water quality standards set under the Clean Water Act (CWA), and ground-water discharge standards set under the National Pollutant Discharge Elimination System (NPDES). State ARARs included New York Ground Water Standards and New York Surface Water Quality Standards.

The primary concern of residents expressed throughout the RI/FS process was that a safe water supply be provided. The public also was concerned about the possibility that exposure to VOCs might have long-term effects. Some individuals were extremely active in voicing their concerns by holding meetings and attending Town Council sessions. EPA held a public meeting on August 17, 1987, to discuss the findings of the RI/FS.

Description of Selected Remedy

The remedy selected for the Haviland Complex site was a combination of three alternatives: source control (Alternative 2), aquifer restoration (Alternative 3), and provision of an alternative water supply for area residents (Alternative 5). Specifically, ground-water extraction wells will be placed on site to contain the contaminant plume, and VOCs will be extracted from ground water by means of a packed tower air stripper. Residents also will be connected to the public water service.

The remedy is expected to meet all Federal and State ARARs within 5 to 10 years. The remedy also is cost effective, protective of human health and the environment because it reduces public exposure to contaminated ground water, and uses a combination of permanent and alternative treatment technologies to the maximum extent practicable. Residents and the State of New York were consulted and concurred with the remedy selected.

KATONAH MUNICIPAL WELL SITE
BEDFORD, NEW YORK

HRS Score: 35.35 **NPL Rank: 527**

Background

The Katonah Municipal Well site is located in the Village of Katonah in the Town of Bedford in Westchester County, New York. The well itself is located on a peninsula that extends into the Muscoot Reservoir, a source of drinking water for New York City. The well supplies water to the residents of Katonah, drawing water primarily from the reservoir, with some contribution from an aquifer underlying the village.

The discovery of contaminants in a well supplying the nearby City of Brewster prompted the Westchester County Department of Health (WCDH) to survey a number of drinking water wells in the area in the fall of 1978. Samples taken from the Katonah Well revealed the presence of halogenated organics, including tetrachloroethylene, at levels exceeding New York State Department of Health standards for drinking water.

Several sources of the contamination were identified. The New York State Department of Environmental Conservation (NYSDEC) traced the contamination to the disposal facility of a waste hauler who had collected wastes from the septic systems of dry cleaners in the village of Katonah. Also, sampling data later confirmed claims that Bedford town employees had dumped waste solvents down a drain located less than 100 feet from the Katonah Well.

The well was closed in December 1978 and the town developed an alternate water supply by installing another well. In addition, the WCDH began source control measures. Dry-cleaning establishments were required to pump out the septic systems and modify their disposal techniques. Initial attempts by the Town and WCDH to remove contaminants failed, however, and the site was referred to NYSDEC for evaluation.

Notice letters were sent to four dry-cleaning establishments and three property owners identifying them as potentially responsible parties (PRPs). A special notice letter, concerning the solvent dumping by town employees, was sent to the Town of Bedford. The site was placed on the NPL in June 1986. The NYSDEC and EPA entered into an agreement in which EPA assumed responsibility for cleanup of the contamination. The remedial investigation/feasibility study (RI/FS) was completed in June 1987 and the ROD was signed September 25, 1987.

Description of Site Work

Results of the EPA lead RI/FS indicated that only tetrachloroethylene, the original contaminant of concern, appeared consistently in the sampling data at levels that exceeded standards established for the site. Tetrachloroethylene was found in levels in ground water and soils above the New York State Department of Health and NYSDEC Technical and Operational Guidance Series and a Federal Water Quality Criteria Value for any single volatile organic compound.

The risk assessment in the RI indicated that the primary potential human health risk was through ingestion of contaminated ground water. The data from the Katonah Well indicated that there was a lifetime excess cancer risk of 10^{-5} associated with ingestion of the water from the Katonah Well. The only potentially affected surface waters are the Katonah Brook and nearby reservoir. Sampling indicated that these bodies have not been affected by the contamination and the potential for future contamination is low.

Description of Feasibility Study

The EPA lead FS identified and evaluated remedial alternatives for the site with respect to criteria in CERCLA and the NCP. Seven alternatives were evaluated:

(1) No action;

(2) Excavation of the soils and off-site disposal;

(3) Excavation of the soils and off-site incineration;

(4) Extraction, treatment, and discharge of ground water to public water distribution system, and containment of soils with synthetic liner and clean cover material;

(5) Alternate water supply via relocation of new well;

(6) On-site treatment of ground water via air stripper, and discharge to public water drinking system; and

(7) Renovation of existing Katonah Well and on-site treatment with air stripper.

Alternatives were evaluated in terms of practicability, implementability, and cost-effectiveness, and for compliance with the CERCLA requirement that remedies attain Federal and State applicable or relevant and appropriate requirements (ARARs) and utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. ARARs at the site include the Federal Water Quality Criteria of 10^{-6} excess cancer risk for tetrachloroethylene, and a State requirement concerning air emissions from the packed air stripper.

Community involvement at Katonah was limited. Local officials have received few complaints regarding the site since the well was shut down in 1978. Public meeting attendance was limited to town officials and one PRP. Specific concerns raised during the public comment period included the physical and financial impacts of the remedial action on Katonah's Commercial Center, the relationship of Katonah Well to the current municipal water supply, and Federal, State, and county jurisdictional issues.

Description of Selected Remedy

The selected remedy for the site is Alternative 6. A new production well and a ground-water treatment facility that employs air stripping techniques will be installed at Katonah Well. A water quality monitoring program will be instituted, and a general cleanup of the area around the pump house was recommended.

The alternative addresses aquifer restoration and utilizes alternative treatment technologies to the maximum extent practicable to reduce the toxicity, mobility and volume of contaminants. It is expected to be protective of human health and the environment, to be cost-effective, and to attain all Federal and State ARARs.

SUFFERN VILLAGE WELL FIELD SITE
SUFFERN, NEW YORK

HRS Score: 35.57 **NPL Rank: 506**

Background

The Suffern Village Well Field site in the Village of Suffern, Rockland County, New York, encompasses 30 acres in the Ramapo River Valley. Four production wells in the well field provide water to approximately 12,000 people. Recharge to the wells is derived mainly from induced infiltration of water from the Ramapo River. The Ramapo River is categorized by the State as a Class A water body, best utilized for potable water supply.

In September 1978, volatile organic compounds (VOCs) were detected in tap water collected from the municipal distribution system. Subsequent monitoring of the site confirmed that ground water had become contaminated with 1,1,1-trichloroethane (TCEA) and trace amounts of other VOCs. Three of the four wells were found to have TCEA at levels above New York Department of Health guidelines and were shut down. A survey of local industries indicated that the Tempcon Corporation, a small oil burner reconditioning business, had used TCEA prior to the contamination discovery. Tempcon subsequently ceased using a seepage disposal pit as well as TCEA-based cleaning products.

In March 1979, initial remedial activities were conducted under the guidance of the Rockland County Health Department (RCHD). Waste materials were removed from the disposal pit and contaminated soil was excavated and devolatilized. However, these initial remedial activities did not remove the ground-water contamination. Later that year, the Village constructed a spray aeration treatment system to remove the TCEA from the municipal water supply. The site was placed on the NPL in October 1984.

Since Tempcon ceased disposal activities, the water quality of the wells has gradually improved. Monitoring results in early 1985 indicated that the aeration treatment was no longer needed, and two wells were brought back into service. Since May 1985, the TCEA concentrations in all four wells have remained below State guidelines with only occasional exceptions. Nevertheless, the complexity of the site hydrogeology led to the belief that even though the suspected source had been remediated, slugs of contaminants may have been released into the subsurface, thereby causing the well field to be under the continual threat of periodic contamination.

EPA signed a cooperative agreement with New York State in March 1985 to undertake the remedial investigation/feasibility study (RI/FS). Although Tempcon was identified as a potentially responsible party, it did not participate in the RI. The ROD was signed September 25, 1987.

Description of Site Work

The RI was initiated in April 1986 and included soil and ground-water sampling programs. TCEA and associated impurities were detected in several of the monitoring wells, indicating that the supply wells still contain ground water with concentrations up to 30 ug/L TCEA. At one location, concentrations ranged from 30 to 1,500 ug/L. The only pathway of concern identified was through ground-water migration from Tempcon and the area of high concentration.

Description of Feasibility Study

After an initial screening, five remaining remedial alternatives were considered:

(1) No action;

(2) Treat the water supply using the existing spray aeration system;

(3) Treat the water supply using a packed tower aeration (PTA) system;

(4) Contain the plume, treat with a PTA system, and discharge to the river; and

(5) Divert the plume, treat with a PTA system, and pump to Suffern distribution system.

The five alternatives were evaluated based on a number of criteria. Applicable or relevant and appropriate requirements (ARARs) identified included the Safe Drinking Water Act (SDWA) and more stringent State guidelines. However, no ARARs were predicted to be exceeded at the well head.

The local community's initial concern about contamination subsided after a newspaper article in late 1978 reported that contamination levels had decreased to a safe level. One public meeting was held in August 1987 to present the findings of the RI/FS.

Description of Selected Remedy

A "no action" alternative, combined with monitoring of the ground water, was selected for this site. Because natural processes will contribute to reducing the toxicity and/or mobility of contaminants, this decision meets the CERCLA requirement of reducing volume, toxicity, and mobility of contaminants. In addition, although there is a statutory preference for treatment-based remedies, the absence of a threat to human health and the environment in this case renders treatment unnecessary. Furthermore, ARARs at the point of ground water are not now, and are not predicted to be, exceeded. In addition, this alternative is the most cost-effective solution.

Because toxic, mobile contaminants will remain in some locations in the aquifer for 5 years, the selected remedy includes restricting access to the aquifer. If monitoring of the site indicates contamination that might jeopardize public health, a second operable unit may be initiated to remediate further problems.

VOLNEY LANDFILL SITE
CONTAMINATION SOURCE OPERABLE UNIT
VOLNEY, NEW YORK

HRS Score: 32.89 **NPL Rank: 627**

Background

The Volney Landfill site, located in Volney, New York, 25 miles northwest of Syracuse in Oswego County, covers 85 acres and includes an inactive, unlined landfill. Land in the vicinity of the site is agricultural with a small residential population. Twenty-five single-family residences using individual wells have been identified as potential receptors of ground water from the landfill. There is a stream/wetland ecosystem downgradient from the site.

The landfill operated from 1969 to 1983 under the ownership of the Oswego Valley Solid Refuse Board and, beginning in 1975, Oswego County. Most of the waste materials disposed of in the landfill consisted of typical residential, commercial, institutional, and light industrial waste. During 1974 to 1975, however, disposal of approximately 8,000 drums from the Pollution Abatement Services (PAS) site was permitted by the New York State Department of Environmental Conservation (NYSDEC). Allegedly, 50 to 200 of these drums contained unidentified liquid waste, and their condition and location in the landfill is unknown.

In the mid-1970s, as the landfill expanded, a leachate collection system was installed at the site. Collected leachate from the site was treated at several locations between 1979 and 1986. In March 1979, Oswego County and the NYSDEC entered into a Consent Order that required the County to take a number of corrective actions, including ground-water monitoring studies, evaluation of leachate and sludge treatment, and the development of a closure plan. Waste disposal continued at the Volney Landfill until September 1983. In the fall of 1985, closure operations for the landfill were completed by Oswego County.

The site was separated into two operable units because of the complexity of the site conditions. Through a cooperative agreement with EPA, the NYSDEC completed the first remedial investigation/feasibility study (RI/FS) for the site in May 1987. This RI/FS addressed the source of contamination in order to prevent further potential contaminant migration from the site, and to eliminate the threat of direct contact. The ROD for this operable unit was signed July 31, 1987. A subsequent operable unit RI/FS will be conducted to address the contamination pathways.

Description of Site Work

The RI conducted by NYSDEC detected a variety of hazardous substances in ground-water monitoring well samples, including 17 volatile compounds, 14 semi-volatile compounds, and 10 metals. Of these compounds, eight were detected at levels in excess of either Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs) or Clean Water Act (CWA) Water Quality Criteria (WQC). Analysis of surface-water samples indicated a generally lower incidence and concentration of contaminants. In addition, RI analyses performed on stream sediment samples indicated the presence of fewer hazardous substances than were found in the ground-water or surface-water samples, although at somewhat higher concentration.

The primary potential human health impact of the site is through contamination of local ground water, which is a source of drinking water for private well users in the area. No significant violation of drinking water standards has yet occurred. Sampling conducted during the RI indicated that low levels of surface-water contamination are not currently a threat to the wetland and stream environment. However, an RI/FS planned for the surface-water contaminant pathway will provide more definitive information.

Description of Feasibility Study

The major objective of the FS was to evaluate source control remedial responses that address the source of contamination, prevent further contaminant migration from the site, and minimize the threat to human health and the environment. Technologies found to be compatible with the specific site conditions and the remedial action objectives for the operable unit were combined into source control alternatives. After an initial screening, the following eight remedial action alternatives were subjected to detailed evaluation:

(1) No action, with site monitoring;

(2) Excavation and off-site waste disposal;

(3) Supplementary capping of landfill side slopes;

(4) Slurry wall with leachate collection and off-site leachate treatment;

(5) Slurry wall with leachate collection and on-site leachate treatment;

(6) Supplemental capping and slurry wall with leachate collection and off-site leachate treatment;

(7) Supplemental capping and slurry wall with leachate collection and on-site leachate treatment; and

(8) On-site incineration.

Applicable or relevant and appropriate requirements (ARARs) considered in the evaluation of these alternatives include Resource Conservation and Recovery Act (RCRA) closure, off-site transportation and disposal, tank storage, incineration, and technical landfill cover requirements; Occupational Safety and Health Act (OSHA) regulations; and State pollution discharge elimination system permitting requirements.

Throughout the Volney Landfill's history, community concern and involvement have been high. Four principal citizens groups have been organized to address the community concerns regarding the alleged disposal of PAS wastes at Volney Landfill, Fulton Terminals, and the Clothier Disposal sites. The local community is generally in agreement with the proposed remedy.

Description of Selected Remedy

The recommended alternative for this operable unit consists of leachate collection, installation of a slurry wall, and capping of the landfill side slopes. The combination of capping and leachate collection is expected to provide a significant reduction in the volume and mobility of hazardous wastes, thus meeting CERCLA statutory preferences for permanence. A recommendation for leachate disposal was not made; leachate will be treated either on site or off site. Both on-site and off-site leachate treatment provide the same degree of remediation and have similar costs. A determination as to which option will be selected will be made pending the results of the treatability studies to be conducted during the remedial design.

VEGA ALTA PUBLIC SUPPLY WELLS
GROUND-WATER CONTAMINATION OPERABLE UNIT
VEGA ALTA, PUERTO RICO

HRS Score: 42.24 **NPL Rank: 334**

Background

The Vega Alta site consists of a public water supply well field located in the municipality of Vega Alta, approximately 32 kilometers west of San Juan, Puerto Rico. Ground water is the primary source of the public water supply for the area. Major activities in the area include agriculture and light industrial manufacturing which use chlorinated solvents. The Vega Alta municipal landfill, located within part of the public well field, has been in operation since the early 1970s and does not employ any leachate containment systems.

Contamination was first discovered in June 1983 during a survey conducted by the U.S. Geological Survey (USGS). Volatile organic compounds (VOCs), including trichloroethylene, were detected in the well field, and 2 of the 10 wells in the field were shut down by the Puerto Rico Aqueduct and Sewer Authority (PRASA). The site was placed on the NPL in September 1983. Between September 1983 and March 1984, the EPA Technical Assistance Team sampled water from the field. Results indicated that the VOCs had not migrated and had been reduced in concentration. An air stripper constructed by PRASA operated from September 1984 to May 1985 at the Ponderosa well, the site of initial trichloroethylene contamination.

The EPA lead remedial investigation/feasibility study (RI/FS) was initiated in 1984. The USGS performed some of the sampling at the site under an interagency agreement with EPA. The FS identified alternatives to address ground-water contamination; source control actions will be considered in a subsequent operable unit FS. Three potentially responsible parties (PRPs) were identified from the local industrial plants and notice letters were sent in July 1984. None of the companies indicated a willingness to undertake cleanup action. The ROD for the first operable unit was signed on September 29, 1987. After the issuance of the ROD, EPA sent notice letters to all PRPs giving them the opportunity to implement the remedy selected and participate in the second operable unit RI/FS to investigate and remedy the sources of contamination.

Description of Site Work

The RI was performed from April 1984 to March 1985, and the final RI report was released in May 1986. Results indicated that the contaminant plume had been contained by the pumping of the well field, VOCs had decreased over time, and the contaminant plume decreased by 58 percent in average concentration over the 16-month period. Consequently, VOC levels in the distribution system were below action levels that would require a removal action.

The risk assessment at the site indicated that the primary exposure mechanism and health risk is by ingestion of contaminated ground water, which poses a maximum total carcinogenic risk of 1.5×10^{-4}. The major contaminants in the ground water are VOCs, particularly trichloroethane and tetrachloroethane. The primary surface discharge points for contaminated ground water are a marsh and the Atlantic Ocean. Consequently, no adverse environmental effects are anticipated as a result of contamination released to the environment.

Description of Feasibility Study

The major objective of FS was to evaluate remedial alternatives using a cost-effective approach consistent with the goals and objectives of CERCLA. The remedial response will address the management of contaminated ground water as the first operable unit. A detailed analysis of alternatives considered the following:

(1) No action with monitoring;

(2) Ground-water treatment with discharge to the PRASA distribution system; and

(3) Ground-water treatment with surface-water discharge and provision of an alternate water supply.

The alternatives were evaluated for compliance with applicable or relevant and appropriate requirements (ARARs); reduction of toxicity, mobility or volume of contaminants; short-term and long-term effectiveness and permanence; implementability; cost; community and State acceptance; and overall protection of human health and the environment.

ARARs for the ground-water cleanup included Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs), Maximum Contaminant Level Goals (MCLGs), Ambient Water Quality Criteria (AWQC) adjusted for drinking water, EPA Drinking Water Health Advisory, EPA Reference Doses, Puerto Rico Health Department Administrative Order 10, and a cumulative health risk of 10^{-6}. Surface-water ARARs included the National Pollution Discharge Elimination System (NPDES), AWQC for aquatic life, and AWQC for human health. ARARs for air releases included the Clean Air Act (CAA).

Meetings with citizens and local officials were held by EPA to discuss the progress of the RI. The public comment period on the FS was extended following a request by the PRPs. Comments on the FS included technical concerns regarding the contaminants, PRP and legal issues, and health risks.

Description of Selected Remedy

Alternative 2 was the initial selected remedy for the site. The remedy included ground-water treatment (by air stripping and carbon adsorption) at four supply wells and discharge of the treated water to the distribution system. Treatment would bring the water to the 10^{-6} ingestion risk level to meet all ARARs. Comments received from the Puerto Rico Department of Health, PRASA, and the Water Pollution Control Committee of Puerto Rico, however, resulted in modification of the selected remedy. In addition to the treatment of four public wells, two private-well users will be provided an alternate water supply from the distribution system. Also, due to public concern, water from the Ponderosa well will not be discharged to the distribution system but rather to surface water, in accordance with an existing NPDES permit. The alternative is expected to comply with ARARs and reduces the toxicity, mobility, or volume of contaminants.

KANE AND LOMBARD SITE
SOURCE CONTROL OPERABLE UNIT
BALTIMORE, MARYLAND

HRS Score: 30.15 **NPL Rank: 724**

Background

The Kane and Lombard site covers 8.4 acres of undeveloped land in the southeast quarter of Baltimore, Maryland. The site is adjacent to a high school and is located near a number of industrial, commercial, and residential properties. Between 1962 and 1971, the site was excavated and refilled with hazardous and solid waste; surface dumping of hazardous waste on the site continued from 1971 to 1984. Several adjacent properties were also found to be excavated and may have been used for waste disposal.

In 1980, Maryland inspectors observed 400 to 500 drums on the property, many of which were damaged. After negotiating with the site owners, the State issued a Complaint in 1983 ordering the owners to clean up the site. The State was unsuccessful in forcing compliance, however, and in April 1984, requested assistance from EPA. EPA authorized the immediate removal of over 1,000 drums and 6 inches of soil beneath the drums. The site was stabilized by regrading and capping.

In October 1984, the site was included on the NPL. EPA initiated a remedial investigation/feasibility study (RI/FS) in October 1985, and a ROD addressing source control was signed September 30, 1987. Adjacent properties are being investigated by the State of Maryland. Because these other sites contribute to ground-water contamination, complete ground-water remediation activities were deferred pending completion of these other studies.

Description of Site Work

The EPA lead RI of ground-water and soil sampling indicated the presence of over 50 organic compounds, including toluene, PCBs, ethylbenzene, dichloroethane, vinyl chloride, and polynuclear aromatics. The most likely routes of potential human exposure to contaminants were identified as use of contaminated ground water and direct contact with contaminated soil. Contaminants were detected in the upper two of three water-bearing zones beneath the site. Because residents were supplied with drinking water from the City of Baltimore, there was no immediate threat to the community. However, the ground-water contamination threatened future use of the aquifers. Although there was a potential threat of direct contact due to the proximity of the high school and recreational facilities, the clay cap constructed in 1984 reduced that threat.

Description of Feasibility Study

The objective of the EPA lead FS was to identify alternatives that would eliminate or reduce soil and ground-water contamination to acceptable risk-based levels. Because the other potential hazardous waste sites in the area were expected to contribute to ground-water contamination, the FS was limited to consideration of source control technologies to reduce the problems resulting from the Kane and Lombard site. Based on this objective, nine remedial alternatives were identified, of which the following passed the initial screening:

(1) No action, with drainage-way maintenance and long-term monitoring;

(2) Construction of subsurface containment structures to prevent ground-water migration, and construction of a multi-layer cap;

(3) Excavation of all waste materials and on-site or off-site incineration;

(4) Excavation of contaminated fill materials and extraction (soil washing); and

(5) *In situ* vitrification.

Each of these alternatives was evaluated with respect to effectiveness, implementability, and cost, and CERCLA requirements for permanent solutions, use of treatment technologies to the maximum extent practicable, and ability to attain applicable or relevant and appropriate requirements (ARARs). The ROD indicated that because the remedy selected would not address complete ground-water remediation, it would not attempt to ensure compliance with all ARARs for the entire site. However, the ROD did not identify any of the ARARs that would be pertinent to the entire site. Only the action-specific ARARs that would apply to the selected remedy were presented (described below).

EPA held a public comment period from August 30, 1987 to September 28, 1987, and a public hearing was held on September 10, 1987. The primary concern expressed by the public was the long-term health effects from contaminants left on the site.

Description of Selected Remedy

The remedy selected (Alternative 2) involved:

- Removal of drums and contaminated hot-spots of soil;
- Construction of subsurface containment structures to prevent ground-water migration;
- Construction of a multi-layer cap and drainage system; and
- Continued ground-water monitoring.

The remedy is an interim measure to control contamination from the Kane and Lombard site. Ground-water contamination from other sources will be addressed after investigations of other potential sites in the area are concluded. The remedy is expected to attain action-specific ARARs, which included Resource Conservation and Recovery Act (RCRA) capping requirements; RCRA Land Disposal

Restrictions; and Clean Water Act (CWA) requirements for discharges to publicly-owned treatment works. The selected remedy was discussed with the State of Maryland and City of Baltimore.

PALMERTON ZINC SITE
BLUE MOUNTAIN OPERABLE UNIT
PALMERTON, PENNSYLVANIA

HRS Score: 42.93 **NPL Rank: 306**

Background

The Palmerton Zinc site, location of the New Jersey Zinc Company smelter, is in the vicinity of Palmerton, Pennsylvania, approximately 70 miles north of Philadelphia. Smelting operations have occurred since 1898 at two separate locations, the west smelter and the east smelter. Until December 1980, primary smelting of concentrated zinc sulfide ores caused emissions of huge quantities of zinc, lead, cadmium, and sulfur dioxide that led to the defoliation of approximately 2,000 acres on Blue Mountain, which is adjacent to the east smelter.

The Superfund investigation of the Palmerton Zinc site focused on three problem areas: (1) the deposition of heavy metals throughout the valley as a result of air emissions from the smelter; (2) the slag pile, approximately 2.5 miles long, consisting of an estimated 33 million tons of smelting waste; and (3) the defoliation of Blue Mountain. The EPA lead remedial investigation/feasibility study (RI/FS), completed in April 1987, focused on the defoliated sections of Blue Mountain. Under a Consent Order signed in September 1985, Gulf and Western, Inc. and Horsehead Industries, Inc., past and current owners of the smelter, are conducting RI/FSs for the other two problem areas. EPA gave these potentially responsible parties notice of their potential liability for the implementation of the Blue Mountain operable unit remedial action. The ROD for this operable unit was signed September 4, 1987.

Description of Site Work

The EPA lead RI for the Blue Mountain operable unit indicated that surface soils at the site were heavily contaminated with cadmium (from a range of 264 to 1,300 ppm), lead (1,200 to 6,475 ppm), and zinc (13,000 to 35,000 ppm). Because the metals were bound in organic materials, most of the metal contamination was contained within the top 6 to 10 inches of soil.

Water flowing across the defoliated portions of Blue Mountain has eroded the surface, become contaminated with metals contained in the soil, and carried the metal-laden soil into a nearby creek. Sampling performed by Horsehead Industries in March 1986, under the consent agreement with EPA, indicated that the runoff exceeds EPA's ambient water quality criteria; in some instances, the levels are 20 times as great. The environmental impacts of the metal contamination include defoliated vegetation; erosion; the absence of microflora, lichens, arthropods, and wildlife species; and heavy metal contamination of fish.

Description of Feasibility Study

The RI/FS report, completed in April 1987, listed the following as major objectives of remedial actions to be taken at the site: (1) minimization of direct contact with contaminated soil; (2) reduction of the volume of runoff; (3) reduction of contamination in runoff; and (4) mitigation of environmental damage. Based on these objectives, source control and mitigation control technologies were developed and screened. Technologies involving treatment were eliminated in this initial screening due to their high cost, poor performance, unreliability, or non-implementability. One alternative, collecting and treating runoff, was deferred for further study in a subsequent RI/FS. Technologies retained for further analysis were the following:

(1) No action;

(2) Deed restrictions only - prohibition of residential development and agricultural use of defoliated portions of Blue Mountain; and

(3) Soil amendments and revegetation with deed restrictions - using a mixture of sewage sludge and fly ash to revegetate defoliated areas.

Applicable or relevant and appropriate requirements (ARARs) identified for this site included: Clean Water Act (CWA) Best Management Practices dealing with surface-water discharges, and State of Pennsylvania Department of Environmental Resources (DER) "Interim Guidelines for Sewage Use for Land Reclamation." The DER guidance includes guidelines for maximum loading rates for metals, maximum dry sludge application, soil acidity adjustment, and other sludge application guidelines.

The community of Palmerton expressed concern about the potential health effects of the soil and ground-water contamination at the site, and also about the financial impact on the zinc company. Many of their concerns can be addressed only when further remedial action for other operable units is taken.

Description of Selected Remedy

The selected remedy for the site includes using sewage sludge and fly ash cover to revegetate defoliated areas. This is an interim remedy that will be consistent with the final comprehensive remedy for the site. When the RI/FSs for the other operable units are completed, RODs will be issued to address all aspects of the site.

The ROD indicates that although the remedy does not attempt to ensure compliance with all ARARs for the entire site, it will be consistent, to the extent practicable, with those action-specific ARARs addressing sludge application and the CWA Best Management Practice requirements. The rocky terrain of Blue Mountain precludes compliance with some Pennsylvania DER sludge application guidelines.

PRESQUE ISLE SITE
ERIE, PENNSYLVANIA

HRS Score: 40.59 **NPL Rank: 376**

Background

The Presque Isle site is located on the Presque Isle State Park peninsula within the City of Erie, Pennsylvania, and includes an abandoned natural gas well and its surrounding contaminated area. The well, known as Presque Isle Beach No.7 well, intercepts a geologic formation known as the Bass Island Formation. In 1982, the well was revealed to be the source of a discharge of noxious, hydrogen-bearing black liquid that had been observed since the early 1970s. The Pennsylvania Department of Environmental Resources (DER) permanently capped the well in October 1982, and determined at that time that previous seepage did not present any health hazards. Presque Isle was included on the NPL, however, because of concerns that the same fluid might be seeping from other abandoned gas wells, of similar age and construction, in the area.

Subsequent investigations revealed that the discharge released hydrogen sulfide into the atmosphere and other hazardous substances into the soil and shallow ground water. EPA and DER investigations of the source discharge focused on whether the discharge was a natural phenomenon, or if it was related to the deep-well injection by Hammermill Paper Company of approximately 1.1 billion gallons of spent pulping liquor into the Bass Island Formation between 1964 and 1971. Currently, Hammermill is the only waste generator that could be linked to the site as a potentially responsible party (PRP). However, the injection of pulping wastes has not been conclusively linked to the discharge at the Beach No.7 well. Hammermill contends that the discharge was a natural fluid. Even if the fluid was identified as resulting from the pulping wastes, Hammermill argues, it would be exempted from CERCLA because it was from a State-permitted disposal operation.

The EPA lead remedial investigation/feasibility study (RI/FS) was completed in October 1985, and the ROD for the site was signed September 30, 1987.

Description of Site Work

Results from the EPA lead RI suggested that the chemical data concerning the initial source of the discharge is ambiguous, and the resolution of these ambiguities at this time is impossible. The most probable conclusion of the RI is that the injection program forced a possibly naturally occurring fluid near the surface to seep from the Beach No.7 well.

Investigations determined that the discharge at the well was an unusual event, and that the threat to the public was eliminated when access to the Bass Island Formation from this well was permanently plugged in 1982. As a result, the only known source of the seepage has been capped. Since that time, there have been no confirmed releases of hydrogen sulfide gas. No migration pathways have been recognized, and based on a July 1987 DER sampling, no significant contamination is present at or adjacent to the Beach No. 7 well.

Description of Feasibility Study

According to the EPA lead FS, the major remedial action objectives at the Presque Isle site included: (1) prevention/minimization of direct human exposure to gaseous and liquid wastes from uncontrolled discharges and (2) prevention/minimization of potential contamination of surface and ground water by pressure flow through fractures, gas and oil wells, or other pathways. Based upon these objectives and site-specific conditions, the following alternatives were developed and evaluated:

(1) Depressurization of Bass Island Formation;

(2) Installation of monitoring wells in Bass Island Formation to determine seepage origin;

(3) Installation of monitoring wells in Bass Island Formation to predict the potential migration pathway of Hammermill's injected waste; and

(4) No action;

The ROD did not discuss the existence of any applicable or relevant and appropriate requirements (ARARs) for the site, nor did it discuss CERCLA statutory preferences for permanent treatment-based remedies.

Currently, there is only a moderate level of community awareness about the Presque Isle site. At a public meeting held in August 1987 to discuss the RI/FS and EPA's recommended alternative, a local environmental group representative maintained that the decision was premature, because studies performed may not be sufficient to ascertain the extent of hazard posed by the site now, and because a natural phenomenon such as an earthquake could cause another seepage incident.

Description of Selected Remedy

Based on the RI findings that the site currently presents no threat to the public and that no significant contamination is present, EPA selected "no action" as the remedy for this site. The high cost and great difficulty of performing the other remedial alternatives were also factors in this selection. However, EPA and DER made a number of recommendations for activities outside the scope of the ROD that Pennsylvania State agencies should implement to minimize further problems or releases associated with natural formation brines in the area.

SALTVILLE WASTE DISPOSAL SITE
SALTVILLE, VIRGINIA

HRS Score: 29.52 **NPL Rank: 737**

Background

The Saltville Waste Disposal Site is located in southwestern Virginia between the towns of Saltville and Allison Gap, along the North Fork of the Holston River (NFHR). From 1951 to 1972, the Olin Corporation operated an electrolytic chlorine and caustic soda plant at the Saltville site that manufactured chlorine gas and sodium hydroxide. One of the electrodes used in the chlorine-caustic process contained mercury that was solubilized and passed into a waste pond in the sludge and brine. Additional mercury was lost as a result of sloppy operating procedures.

An investigation revealed the presence of severe mercury contamination, and both Virginia and Tennessee banned fishing in the NFHR. Mercury losses were estimated by Olin to be 100 pounds per day between 1951 and 1970. After this discovery, however, Olin modified its procedures to cut mercury losses to 1/4 pound per day.

In 1970, the Virginia State Water Control Board (SWCB) adopted a Total Dissolved Solids Standard of 500 mg/l for the river, which Olin was not able to meet. As a result of this, as well as increased operating costs, Olin closed its Saltville operations in 1972. Annual sampling of fish and sediment in the NFHR since 1970 has indicated mercury contamination in the sediments and surface water near the site and in the tissues of fish up to 80 miles downstream from the site.

The site was listed on the proposed NPL in December 1982, and the SWCB issued a Consent Order to the Olin Corporation that required Olin to take certain remedial measures. Under the Consent Order, the Olin Corporation dredged the river bed, extracted mercury, spread the sediments over the plant site, and constructed a cap. Additionally, Olin has continued fish and sediment sampling to monitor the extent of mercury contamination. The ROD was signed June 30, 1987.

Description of Site Work

A remedial investigation (RI) was not performed at this site because of the availability of data and ongoing sampling effort being conducted by Olin under the Consent Order. Instead, a risk assessment (RA) was conducted using available data to determine if data gaps existed. Several data gaps were identified in the RA.

The contaminant of concern at the site is mercury seeping into the NFHR from the waste pond outfall. Mercury accumulates in fish and other organisms; its effects become more widespread as it is carried up the food chain. The NFHR, like other rivers in the area, supports a relatively diverse population of freshwater mollusks, including species of endangered mussels.

Description of Feasibility Study

The EPA and the State of Virginia initiated a feasibility study (FS) in 1986 and identified several remedial alternatives that would reduce the mercury concentration in the NFHR. However, due to the inadequacy of data, the Fish and Wildlife Service and EPA decided that a complete bioassessment of potential effects on the area's environment is necessary to develop remedial actions. Thus, the FS was used to develop interim remedies only.

Alternatives identified in the FS were separated into two categories: (1) source controls; and (2) management of contaminant migration in the river. After screening, four treatment alternatives were considered in detail:

(1) No action;

(2) Upgrading run-on controls with ditches, berms, and downchutes;

(3) Upgrading run-on controls, treating pond outfall, and installing ground-water monitoring systems; and

(4) Upgrading run-on controls, capping ponds, and installing ground-water monitoring systems.

Several applicable or relevant and appropriate requirements (ARARs) were considered during the FS process: Resource Conservation and Recovery Act (RCRA) Subtitle C, Clean Water Act (CWA), Virginia State Water Control Laws and Regulations, Floodplains and Wetlands Executive Order and Guidance, and Fish and Wildlife Coordination Act requirements.

Despite the ban on fishing, community interest during the RI/FS process was low and no public meeting was requested during the comment period. Most comments on the FS were received from the States of Virginia and Tennessee and from the Olin Corporation.

Description of Selected Remedy

The selected alternative for the Saltville site consists of upgradient storm-water control by constructing ditches, berms, and downchutes; treatment of pond outfall; and ground-water monitoring (Alternative 3). The recommended alternative is an interim measure because additional studies are needed to determine the extent of contamination. These studies will include a ground-water study, a bioassessment, and the implementation of additional sampling along the NFHR. Once these studies are complete, a final remedial solution will be developed.

WEST VIRGINIA ORDNANCE WORKS
FIRST OPERABLE UNIT
MASON COUNTY, WEST VIRGINIA

HRS Score: 35.72 **NPL Rank: 89**

Background

The West Virginia Ordnance Works (WVOW) site covers 8,323 acres along the east bank of the Ohio River, 58 miles northwest of Charleston. One-third of this area is occupied by the McClintic Wildlife Station, a fish and migratory waterfowl management area. From 1942 to 1945, the site was used by the Federal government to produce trinitrotoluene (TNT) explosives. Operations ceased in 1945, and the land was deeded to West Virginia on the condition that the site be used for wildlife management. Subsequent limited industrial activity at the WVOW site may have contributed to the environmental contamination.

In May 1981, the West Virginia Department of Natural Resources (DNR) and EPA identified the release of TNT processing wastes into a pond in the wildlife area. Based on subsequent studies by EPA and the DNR, WVOW was placed on the NPL. Hydrogeologic investigations indicated the potential for migration of contaminants via surface- or ground-water pathways to deeper levels of the aquifer or to the Ohio River. Nitro-aromatic residues and other TNT manufacturing byproducts presented the most serious carcinogenic and migratory threat. In January 1986, the Department of Defense (DOD) and EPA agreed to divide projected site work into two geographically separate operable units. Remedial efforts for the first operable unit, the TNT Manufacturing Area, Burning Grounds, and Industrial Sewerlines, were initiated, as additional data were gathered for the second operable unit. The ROD for the first operable unit was signed March 31, 1987.

Description of Site Work

The remedial investigation (RI) for the first operable unit was completed in March 1986. The RI indicated that the major sources of nitro-aromatic contamination were: (1) surface and subsurface soils in the TNT and Burning Grounds areas; and (2) the industrial sewerlines in the TNT area. Contaminants in the TNT and Burning Ground areas included residual nitro-aromatic compounds and contaminated soils. Nitro-aromatic compounds were also observed in the ground water in the shallow aquifer and in surface water in the TNT area. However, no nitro-aromatic compounds were detected in ground water from supply wells near the wildlife station. Residences will not be constructed in the area nor will the ground water beneath the site be used for drinking.

The endangerment assessment concluded that although contaminants presented the threat of direct and indirect exposure, the restrictive nature of the wildlife station reduced the actual risk to human health. Potential risks to human health were posed by consumption of contaminated wildlife at the site and by reactive substances in sewerlines.

Description of Feasibility Study

The feasibility study (FS) for the first operable unit was completed in October 1986. The primary objectives were that the selected remedy eliminate the safety hazards of reactive wastes and stabilize the cancer risk for hunters and visitors in the wildlife station. For each area to be addressed in the first operable unit, a variety of remedial alternatives were proposed, including: multimedia capping, off-site and on-site incineration of contaminants, off-site and on-site landfilling, placement of a soil cover, and no action.

Use of any of the above technologies would require compliance with Federal and State applicable or relevant and appropriate requirements (ARARs). Federal regulations that are potential ARARs included Resource Conservation and Recovery Act (RCRA) disposal requirements, National Ambient Air Quality Standards (NAAQS), transportation requirements, and Federal Water Quality Criteria (WQC). State ARARs included water quality standards, waste disposal regulations, and wetlands regulations.

Members of the public residing near the site have shown interest in its status since 1984, primarily because of contaminated ground water. Public meetings were held in February and in November 1986 to discuss the RI and the FS, respectively. The fact that oral comments were in support of the remedy, and that no written comments were received at the November meeting, suggested there was little objection to the chosen remedial alternative.

Description of Selected Remedy

EPA recommended a four-part remedial approach for the WVOW site:

- *In situ* flaming of reactive TNT residues in the Burning Grounds Area and installation of soil cover over areas with high nitro-aromatics contamination;
- Installation of soil cover over contamination in the TNT Manufacturing Area;
- Disposal of asbestos found in the Burning Grounds Area; and
- Flushing and backfilling of reactive sewerline with installation of soil cover in areas of high contamination.

EPA found this remedial approach to be the least costly alternative that also protects against direct contact and minimizes exposure pathways. The technologies involved in the preferred remedy are acceptable and proven; no alternative offers a significant technical advantage. The preferred remedy does require long-term care to maintain the integrity of the soil cover.

GOLD COAST OIL CORPORATION SITE
MIAMI, FLORIDA

HRS Score: 57.80 **NPL Rank: 67**

Background

The Gold Coast Oil Corporation (GCO) site is a 2-acre parcel of land located in Miami, Florida. The owner of the property, CSX Transportation, leased it to GCO which, along with Solvent Extraction Incorporated, used the site as a solvent reclamation facility during the 1970s. The site is within a commercial, industrial, and residential area having a population greater than 80,000 within a 3-mile radius. The Biscayne Aquifer, which underlies a portion of the site, is the only ground-water source of drinking water in southeastern Florida.

During facility operations, the companies sprayed residue directly onto the ground and stored 53 drums of sludge-contaminated soil on site. There were also 2,500 corroded and leaking drums on site containing sludge from the distilling operation, contaminated soils, and paint sludges. All wastes generated by the solvent recovery operations were disposed of or stored on site.

In 1980, the Dade County Department of Environmental Resource Management (DERM) sampled the illegally dumped and stored wastes. During 1981 and 1982, the State, DERM, and EPA sought to remedy conditions at the site through various enforcement actions against the facility, its operator, and the site owner. When these actions failed, EPA initiated an investigation to determine if a CERCLA response was necessary. In 1982, in response to potential Federal enforcement and cleanup actions, CSX evicted GCO and agreed to clean up the surface of the site voluntarily. Two major sampling efforts were performed after the voluntary cleanup, and it was determined that the soil and ground water were still extremely contaminated.

EPA added the Gold Coast Oil site to the NPL in March 1983. EPA identified a number of potentially responsible parties (PRPs). In addition to the cleanup by CSX, generators of waste stored at the site joined together to perform the remedial investigation (RI). The RI was reviewed by EPA and the State, and EPA followed with the feasibility study (FS), completed in 1984. EPA conducted an endangerment assessment in late 1986, and the ROD for the site was signed September 11, 1987. Currently, negotiations with the identified PRPs for performance of the selected remedial action are ongoing. A settlement is expected by June 1988.

Description of Site Work

The RI performed by the generators in 1983 and additional studies by EPA and DERM indicated that soil and ground water were contaminated with organic compounds and heavy metals. The studies identified leaching of contaminants from surface and subsurface soils to the ground water and migration of contaminated ground water to surface water as the primary pathways of concern. The general contaminants of concern were halogenated solvents, non-halogenated solvents, still bottoms from the recovery of these solvents, and heavy metals. Analysis of surface soil in 1983 indicated that the distilling and drum storage areas were contaminated with chlorobenzene, 4-nitrophenol, toluene, and diphthalate. The 1986 sampling indicated residual surface contamination. The 1986 analysis of subsurface soil samples revealed high levels of toluene, ethyl benzene, xylene, styrene, and bis(2-ethyl hexyl) phthalate, although levels were lower than in 1983. Ground-water data indicated an area of significant trichloroethylene and tetrachloroethylene contamination in the northeast corner of the site. Concentrations of metals in ground water decreased between the 1983 and 1986 samplings, but organics were still present in 1986.

Description of Feasibility Study

The objective of the FS was to identify a remedy(ies) that would (1) eliminate the risk of exposure from contaminated soils and (2) remediate contaminated drinking-water sources before the plume migrated further and contaminated more of the Biscayne Aquifer. EPA developed and evaluated technologies that addressed source control and ground-water contamination. The alternatives that passed the initial screening were:

(1) No action;

(2) Air stripping of soils and ground-water recovery, treatment, and disposal;

(3) Steam stripping of soils and ground-water recovery, treatment, and disposal;

(4) On-site incineration of soils and ground-water recovery, treatment, and disposal;

(5) Stabilization/solidification of soils and ground-water recovery, treatment, and disposal;

(6) Off-site incineration of soils and ground-water recovery, treatment, and disposal; and

(7) Off-site disposal of soils and ground-water recovery, treatment, and disposal.

Each remedial alternative was screened against the CERCLA criteria of effectiveness, implementability, protectiveness, and cost. The applicable or relevant and appropriate requirements (ARARs) identified for the site were the National Environmental Protection Act (NEPA), Department of Transportation (DOT) Hazardous Material Transport Rules, Resource Conservation and Recovery Act (RCRA) land disposal ban, Clean Air Act (CAA) National Ambient Air Quality Standards (NAAQS), Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs), Clean Water Act (CWA) pretreatment and discharge standards, and Florida Administrative Code Chapter 17-3 Water Quality Standards.

Although citizen interest in the Miami area in water quality is very high, community involvement in the Gold Coast site was limited. EPA held one public meeting, but the majority of those in attendance were representatives of the

PRPs. EPA also published newsletters with current information on the site. No public comments were received during the formal FS comment period.

Description of Selected Remedy

The remedial action alternative recommended for the site included excavation of contaminated soils with off-site disposal of hazardous waste sludges at an approved RCRA facility, and stabilization/solidification of the remaining contaminated soils (Alternative 7). To address the contamination found in the ground water beneath the site, the recommended alternative also included installation of a recovery well field, treatment of recovered ground water, and disposal of treatment residues. EPA has not yet selected the ground-water treatment method.

The chosen alternative uses treatment technologies to the maximum extent practicable, employs a permanent solution that reduces the toxicity and mobility of the contamination, and is protective of human health and the environment. EPA also expects the remedy to attain ARARs.

NORTHWEST 58th STREET LANDFILL SITE
BISCAYNE AQUIFER FINAL OPERABLE UNIT
DADE COUNTY, FLORIDA

HRS Score: 49.43 **NPL Rank: 181**

Background

The Northwest (NW) 58th Street Landfill site is located in northwest Dade County, Florida. From 1952 to 1982, the one-square mile site was operated as an open dump. Although it was not operated as a hazardous waste landfill, it likely received some hazardous waste. Some early wastes were disposed of in shallow trenches, resulting in waste deposits in the saturated zone of the Biscayne Aquifer, which underlies the site. The aquifer is the sole source of drinking water for the Miami/Dade County area.

The site was placed on the NPL in 1981, and in October 1982, EPA ordered the county to cease accepting municipal wastes. The site is one of three NPL sites that affect the same general area of the Biscayne Aquifer. The other two sites are Miami Drum Services and Miami International Airport. Because the effects of these sites on the aquifer are interrelated, remedial activities at the sites are being addressed collectively. EPA completed the remedial investigation/feasibility study (RI/FS) for the Biscayne Aquifer study area in 1984.

A total of four operable units will be completed as part of the complete remedy under the Biscayne Aquifer Study. The first operable unit involved soil and ground-water cleanup at the Miami Drum Services site, and a ROD for source control was signed in September 1982. A ROD for the second operable unit, the Varsol spill at the Miami Airport, was signed in March 1985 and required no action. The ROD for the third operable unit, the Study Area Ground-Water operable unit, was signed in September 1985 and called for air stripping in the existing ground-water treatment process. The final operable unit addressed source control at the NW 58th Street Landfill and provision of alternative water supply. The ROD for the landfill site operable unit was signed September 21, 1987.

Description of Site Work

Numerous investigations have been conducted at the landfill site, including the efforts conducted as part of the Biscayne Aquifer RI/FS. Investigations at this site concentrated on determining the magnitude and extent of ground-water contamination resulting from the landfill. A study by the U.S. Geological Survey indicated the presence of a plume of contamination migrating downgradient from the landfill. The results of the RI indicated that widespread low to moderate levels of several toxic contaminants, primarily VOCs, were present in the ground water.

An endangerment assessment in 1986 found eight contaminants of concern in the monitoring wells both upgradient and downgradient of the site: arsenic, chromium, zinc, benzene, chlorobenzene, 1,1,2,2-tetrachloroethane, trichloroethene, and vinyl chloride. The primary route of human exposure to the contamination is through ingestion of contaminated water. Of particular concern are two sets of public drinking water supply well fields located within 2.5 miles of the site. The population served by the well fields is estimated to be about 750,000.

Description of Feasibility Study

The FS for the landfill operable unit focused on identifying remedies to: (1) reduce on-site soil contamination; (2) reduce site-related ground-water contamination; and (3) protect downgradient private well users. The FS considered several alternatives applicable to the landfill site:

(1) No action;

(2) Installation of on-site recovery wells and treatment of ground water prior to discharge;

(3) Installation of on-site recovery wells and deep injection well disposal of recovered ground water;

(4) Containment of contaminants;

(5) Excavation of the landfill; and

(6) Implementation of leachate control measures.

Possible remedies were screened with respect to practicability, implementability, and cost; CERCLA criteria for employing permanent solutions and treatment technologies to the maximum extent practicable; and ability to attain applicable or relevant and appropriate requirements (ARARs). ARARs identified for the site include the Safe Drinking Water Act (SDWA), Clean Water Act (CWA), Resource Conservation and Recovery Act (RCRA) Subtitle D landfill closure requirements, and Florida Administrative Code (FAC) requirements for resource recovery and management, permitting, water quality, storm water discharge, and underground injection control.

In July 1984, a community relations plan was completed for the Biscayne Aquifer area. Under this plan, EPA convened four public meetings, held workshops on issues of special interest, and printed and distributed a newsletter. Expressed public interest focused on closure of the landfill.

Description of Selected Remedy

The selected alternative consisted of closing the NW 58th Street Landfill in accordance with the technical requirements of the State regulations, providing municipal water to private well users, and collecting the water and treating it by air strippers at municipal treatment plants. Closure activities will include leachate control through a combination of grading, drainage control, and capping. Gas migration and odor controls also will be implemented as needed, as will long-term monitoring of ground-water quality and operation and maintenance of the closure.

The selected remedy will reduce the amount of leachate produced and its mobility, but will not reduce toxicity. Alternatives involving treatment were judged to be impracticable and not cost-effective due to the magnitude of waste to be treated (approximately 27 million cubic yards). The remedy does provide for long-term protection of the ground water and public health. The remedy is expected to attain ARARs.

PARRAMORE SURPLUS COMPANY SITE
MT. PLEASANT, FLORIDA

HRS Score: 37.61 **NPL Rank: 455**

Background

The Parramore Surplus Company site is located in Mt. Pleasant, Florida, approximately 30 miles from Tallahassee. The 25-acre site is an active facility which stores and resells surplus government products. The population within a one-mile radius of the site numbers less than 100 and the land adjacent to the site is used primarily for agriculture.

In 1972, drums of paint residue, waste oil, alcohols, and degreasers were purchased and stored on the site. In 1982, the Florida Department of Environmental Regulation (FDER) discovered that many of the 400 to 600 drums were leaking contaminants, thus causing damage to the site vegetation. EPA's analysis of samples collected from the site indicated PCB contamination in the soil. The site was placed on the NPL at the request of FDER. In August 1982, FDER notified the facility that it was in violation of Florida Administrative Code requirements concerning hazardous waste storage facilities. The owner of the Parramore Surplus facility, Mr. Houston Parramore, was identified as the primary potentially responsible party (PRP). Following a meeting with FDER and EPA, Parramore removed the leaking drums and contaminated soil and shipped them to an approved hazardous waste disposal facility. Parramore also constructed a fence around the site and posted warning signs. In July of 1983, additional areas of contamination were discovered and Parramore was requested to excavate and contain these areas. In October 1983, FDER conducted an inspection of the site and found that all conditions of the site cleanup had been met.

EPA conducted a modified remedial investigation (RI) of the site in March 1985 and completed a public health evaluation (PHE) in 1987 to determine whether further soil remediation was necessary to protect human health. No feasibility study (FS) was conducted because results of the PHE indicated that residual levels of soil contamination posed no substantial threat to human health or the environment. The ROD was signed September 15, 1987.

Description of Site Work

The EPA lead modified RI included soil sampling and installation of temporary ground-water monitoring well-points. Results of the modified RI indicated the presence of soil contamination on site. Results of ground-water samples were considered inaccurate because the ground water contained large amounts of suspended sediments. The possibility of ground-water contamination, however, was considered unlikely because of the shallowness of the soil contamination and the limited area to which it was confined.

The modified RI detected eight contaminants of concern at the site: lead, zinc, cyanide, Bis(2-ethylhexyl) phthalate, di-n-butyl phthalate, ethylbenzene, methyl ethyl ketone, and PCB-1254. Those at highest risk from exposure to on-site contamination, through inhalation or ingestion, included Parramore Surplus Company employees and wildlife that feed on site vegetation. The PHE, which was completed after the contaminated soil was removed, detected lead, zinc, and PCB-

1254 but at such low levels that they did not pose a threat to human health or the environment. Based on the PHE, therefore, it was concluded that no further remediation of the soil was necessary.

Description of Feasibility Study

EPA did not complete an FS of alternative remedial actions at the Parramore site because no need for further remedial action was indicated by the PHE. Applicable or relevant and appropriate Federal and State requirements (ARARs) included the Toxic Substances Control Act (TSCA), Federal and State drinking water standards, and monitoring well installation and construction rules under the Florida Administrative Code.

EPA established an information repository at a public library near the site in July 1987 and published notices of the proposed remedial action plan and requests for public comment. The public was also invited to request a public meeting with EPA to discuss the site and the remedial action plan. No comments or requests for a public meeting were received and no public opposition to the recommended action is expected.

Description of Selected Remedy

No further remedial action is planned at the Parramore Surplus Company site. A ground-water quality assessment will be conducted to ensure that local drinking water supplies have not been adversely affected by hazardous substances on site. If ground-water contaminant levels exceed standards contained in ARARs, a complete ground-water investigation will be done.

TRI-CITY OIL CONSERVATIONIST CORPORATION SITE
TEMPLE TERRACE, FLORIDA

HRS Score: 39.30 **NPL Rank: 408**

Background

The Tri-City Oil Conservationist Corporation site, a 1/4 acre property located in Temple Terrace, Florida, 5 miles north of Tampa, was used as a waste oil collection and distribution center from 1978 to 1983. Operating conditions during this time led to spills during transfer operations. leaks from tanks and liners, and accumulation of liquid wastes at the site. The Florida Department of Environmental Regulation (FDER) received several public complaints regarding odor problems and "sloppy" practices.

In 1982, a 3,000 gallon waste oil spill occurred. FDER subsequently analyzed soil and sludge from the site and discovered hydrocarbons and heavy metals such as lead, chromium, and zinc. Additional sampling in 1984 revealed high concentrations of benzene, toluene, xylene, and chlorinated hydrocarbons in soils as deep as 1 to 2 feet below the surface. Contaminated soils posed an environmental threat both to ground and surface waters because of migration from the source area to potential water supplies. Both human and animal populations use the surface waters near the site (such as the Hillsborough River, located 3,000 feet from the site) as drinking water supplies. In addition, eight private drinking water wells are located within 1/4 mile of the site.

Prior to the remedial investigation/feasibility study (RI/FS), both EPA and FDER conducted removal actions. The ROD for the site was signed September 11, 1987. A potentially responsible party search report identified several owner/operators and generators who were potentially responsible parties (PRPs). One PRP, Tri-City Oil Conservationist Corporation, was dissolved involuntarily on November 10, 1983, and other owner/operator PRPs are bankrupt. EPA has not yet initiated a cost-recovery action against the PRPs for the $50,000 spent in a removal action in February 1984, although it may do so in the future. The State of Florida currently is pursuing a civil cost-recovery action against the owner/operators of the site for the $200,000 spent for its contamination assessment and subsequent removal action.

Description of Site Work

In response to the substantial endangerment to human health and the environment, EPA conducted an immediate removal of contaminated waste oils, sludges and contaminated soils in 1984. Because no follow-up sampling was done immediately after this removal, the FDER assessed the remaining contamination later that year. The assessment revealed that VOCs and heavy metals still contaminated the top 1 to 3 feet of soil on the site.

Based on this assessment, FDER initiated a removal effort that reduced contamination to background levels. This involved the removal of 850 cubic yards of contaminated soil, removal of two above-ground storage tanks, excavation of a 16,000 gallon underground storage tank, and removal of 5,000 gallons of organic liquids and sludges. When excavation was completed, clean fill was used to bring the site back to its original grade. This action was completed in May 1985. FDER conducted follow-up ground-water sampling in late 1985 and the first half of 1986.

Upon review of the data generated by the FDER in its sampling efforts, as well as of other data, it was determined that the Tri-City site no longer was contaminated. All of the contaminated soil and sludges have been removed to an EPA-approved hazardous waste facility, and 1986 sampling indicated that no ground-water contaminants exceeded drinking water standards.

Description of Feasibility Study

The EPA lead RI/FS identified the following technologies for addressing the site contamination: thermal destruction, capping, aeration, solidification/stabilization, and surface soil/sediment removal. Applicable or relevant and appropriate requirements (ARARs) identified for the site included the following: Florida drinking and surface-water standards, the Safe Drinking Water Act (SDWA), EPA Ground-Water Protection Strategy, and the Clean Water Act (CWA). However, because it appeared that the site no longer posed a health-related or environmental threat, an evaluation of various technologies and their effectiveness, applicability, and consistency with ARARs was found to be unnecessary.

No extensive community relations activities have been conducted for the site due to the lack of interest expressed by the local community. Both EPA and FDER have received only one inquiry and no complaints since the public notice outlining EPA's proposed plan for further activities was issued in August 1987.

Description of Selected Remedy

Under the "no action" alternative selected for this site, no additional remedial actions will be performed. Because all contaminated soils have been removed and no significant contamination reached ground-water supplies in the area, additional remedial activities are not necessary.

The ROD indicated that the remedy selected was considered to be the most effective alternative in terms of removing the threats posed by the site, given both the clean-up technologies available and the size of the site. Given the small volume of contaminated materials, the "no action" remedy utilizes permanent treatment technologies to the maximum extent practicable. EPA concurred with the past remedial actions conducted by the State of Florida, and the State concurred with the "no action" final remedy chosen by EPA for the site.

TOWER CHEMICAL COMPANY SITE
CLERMONT, FLORIDA

HRS Score: 44.03 **NPL Rank: 286**

Background

The Tower Chemical Company site is located 15 miles west of Orlando, Florida, along the eastern edge of Lake County. From 1957 to 1981, the Tower Chemical Company manufactured, formulated, and stored pesticides at the site. The main facility included a burn/burial area for solid wastes and a percolation/evaporation pond for acidic wastewaters. A spray irrigation field consisted of four parallel strips of land.

Some of the chemicals manufactured at the facility required the use of dichlorobenzil in the production process. During the last few months of the company's operation, dichlorobenzil was manufactured in-house using dichloro-diphenyl-trichloroethane (DDT). Acidic wastewaters from this manufacturing process were discharged into the unlined percolation/evaporation pond located at the main facility. In July 1980, the pond overflowed and the spray irrigation field was then used to discharge acidic wastewaters.

As a result of the overflow, both EPA and the Florida Department of Environmental Regulation (FDER) initiated studies of the Tower site and the nearby lake and stream. All production was stopped at the facility in December 1980, and the facility was subsequently decommissioned. The studies indicated high concentrations of DDT and associated pesticide compounds in the main facility waste disposal areas, stream, and ground water. Soils at the spray irrigation field were contaminated by pesticides, primarily within the top foot of soil.

The Tower site was listed on the NPL in December 1982. A remedial investigation/feasibility study (RI/FS) was initiated in March 1984 and the ROD was signed June 30, 1987. Although several potentially responsible parties were identified, none have made a proposal to undertake any response actions.

Description of Site Work

The EPA initiated the RI/FS after it conducted an immediate removal measure (IRM) at the site. During the IRM, the burn/burial area was excavated and covered with a clay cap, and water from the percolation/evaporation pond was pumped, treated, and discharged. The contaminated sediments from the pond were excavated, dewatered, and disposed off site. Although the FDER conducted an IRM at the spray irrigation field, this area was addressed in the RI/FS.

The RI was conducted 8 months after the IRM, and revealed that only a small volume of soils (approximately 4,000 cubic feet) in the main facility area still exceeded the cleanup criteria. The RI also showed that no contamination existed within the spray irrigation field in excess of the established soil cleanup criteria that were jointly established for the site by EPA and FDER. The results of ground-water sampling and analysis at the main facility revealed that the surficial aquifer, which flows northeast toward the unnamed creek, was contaminated with xylene, ethyl benzene, gamma-BHC, chlorobenzilate, 4,4'-DDT with its derivatives, and several other compounds. Contaminant migration had extended beyond the boundaries of the burn/burial area, with possible contaminated ground-water discharge occurring into the ditch east of the facility. Vertically, contaminated ground water in the burn/burial area was identified at a depth of 35 feet.

Description of Feasibility Study

During the feasibility study (FS) process, potential remedial technologies were presented in groups targeted at remediating a single aspect of the site, either surface- and ground-water contamination, soil contamination, or institutional controls. These remedial units then were combined to develop full remedial alternatives that would be applied to the conditions existing at the Tower site. After screening, eight comprehensive remedial alternatives remained, including the "no action" alternative. The other seven alternatives included ground-water and surface-water monitoring and various combinations of the following:

- Municipal water supply extension;
- Individual treatment units;
- Tanks and concrete pad removal;
- Point source runoff diversion;
- Capping;
- Surface regrading and revegetation;
- Surface soil/sediment removal;
- Ground-water removal;
- Excavation;
- Water treatment technologies;
- Soil incineration; and
- Off-site disposal.

Several combinations of technologies resulted in remedial actions that comply with applicable or relevant and appropriate requirements (ARARs). ARARs considered in the FS included the Safe Drinking Water Act (SDWA), Clean Water Act (CWA), the Resource Conservation and Recovery Act (RCRA), and Florida regulations for surface water, drinking water, and hazardous waste.

Community interest in the Tower site has been limited, although area residents did express concern about both health and non-health issues. Findings of the RI/FS were discussed at the public meeting in October, 1986 that served to initiate a 3-week public comment period.

Description of Selected Remedy

The alternative recommended for the Tower Chemical site consisted of removal and treatment of contaminated ground water; provision of individual treatment units for two private wells in the immediate site vicinity; removal and thermal treatment of contaminated surface soils from both the overflow and portions of the burn/burial area of the site; pilot excavation of the burn/burial area to determine the composition of the magnetic anomaly; removal of the two tanks, concrete pads, and contaminated soils; and point source runoff diversion.

This alternative is the most effective in terms of removing the threats posed by the site and complies with CERCLA. This remedy is also cost-effective, is expected to meet all ARARs, and uses permanent solutions and treatment technologies to the maximum extent practicable.

POWERSVILLE LANDFILL SITE
POWERSVILLE, GEORGIA

HRS Score: 35.53 **NPL Rank: 517**

Background

The Powersville Landfill site occupies approximately 15 acres of rural land in Powersville, Peach County, Georgia. The surrounding land is used predominantly for general crop farming, with some acreage devoted to orchards and cattle grazing. The Providence aquifer, located beneath the site, provides water for irrigation and consumption.

Originally used as a borrow pit, the site began receiving municipal and industrial wastes in 1969. In 1973, a portion of the landfill was formally established as a disposal site for pesticides and other hazardous wastes. However, citizen complaints and State investigations indicated that pesticide wastes were also discarded in the municipal section of the landfill prior to 1973. In March 1977, the Georgia Department of Natural Resources Environmental Protection Division (EPD) recommended that the site be closed because of its location above the Providence aquifer. The site was included on the NPL in 1983.

EPA initiated a remedial investigation/feasibility study (RI/FS) of the site in December 1984. In support of the RI/FS, EPA conducted an endangerment assessment to evaluate risks to public health. Preliminary investigations revealed contamination in the soil and ground water, both of which provide potential pathways for migration of contaminants. A draft FS for remedial alternatives was completed in July 1987, and the ROD was signed September 30, 1987.

Description of Site Work

The RI detected the presence of chlorinated organics and pesticides in both soil and ground water. Contaminants of concern in ground water included benzene hexachloride (BHC), vinyl chloride, lead, and 1,2-dichloroethane. BHC and 1,2-dichloroethane were also found to be soluble in the soil. The endangerment assessment indicated a potential long-term health risk associated with the consumption of ground water from wells. Minimal risk was found to be associated with direct contact with landfill surface soils by future residents of the area.

Description of Feasibility Study

EPA developed a number of remedial alternatives to address ground-water, surface-water, and soil contamination at the site. Alternatives were screened on the basis of cost, effectiveness, implementability, and compliance with applicable or relevant and appropriate requirements (ARARs). Preference was given to permanent solutions and alternative treatment technologies. After an initial screening, the following combinations of alternatives were retained for further evaluation:

(1) No action, with institutional controls on the use of ground water and on the site itself;

(2) Capping of the hazardous waste and municipal fill areas;

(3) Excavation and on-site incineration of the hazardous waste area, and capping of the municipal fill area;

(4) Stabilization/solidification of the hazardous waste area, with capping of the municipal fill area;

(5) Alternative 2 with ground-water pumping and treatment;

(6) Alternative 3 with ground-water pumping and treatment;

(7) Alternative 4 with ground-water pumping and treatment;

(8) Alternative 2 with provision of an alternative drinking water supply;

(9) Alternative 3 with provision of an alternative drinking water supply;

(10) Alternative 4 with provision of an alternative drinking water supply;

(11) Alternative 5 with provision of an alternative drinking water supply;

(12) Alternative 9 with ground-water pumping and treatment; and

(13) Alternative 7 with provision of an alternative drinking water supply.

ARARs identified in the FS as "applicable or relevant" included the Safe Drinking Water Act (SDWA), the Resource Conservation and Recovery Act (RCRA), the Clean Air Act (CAA), the Ground Water Protection Strategy, and the Clean Water Act (CWA).

Community concern regarding the Powersville site was particularly high while the landfill was receiving waste during the 1960s and 1970s. Following the discovery of ground-water contamination in 1983, citizens began requesting sampling of their wells, and press coverage of the site increased. On August 4, 1987, EPA held a public meeting to discuss findings of the RI/FS. During the 3-week comment period, the major concern expressed by residents was whether the quality of drinking water was sufficiently high.

Description of Selected Remedy

The remedial action alternative recommended for the Powersville Landfill is Alternative 8, capping the hazardous waste and municipal landfill areas coupled with provision of an alternative drinking water supply. Institutional controls will be established to prohibit drilling of wells in the area.

The caps will be designed to minimize flow of liquids through the landfill over the long term and should reduce or eliminate the mobility of contaminants in both disposal areas. The alternative drinking water supply system will provide a reliable, long-term source of drinking water to nearby residents. Although adding a new drinking water system will not alleviate site contamination, it will reduce long-term health risks. The remedy is cost-effective, uses permanent treatment technologies to the maximum extent practicable, will protect public health, and is expected to meet ARARs. Capping and installation of an alternative water supply system are both relatively simple and established technologies.

The State of Georgia has concurred with EPA's selection of the recommended alternative. Because the site was operated by a county of the State, the State must pay 50 percent of remedial costs. If a more costly alternative is ultimately chosen, the State may disapprove all or some portions of the approach.

NEWPORT DUMP SITE
WILDER, KENTUCKY

HRS Score: 37.63 **NPL Rank: 453**

Background

The Newport Dump site is a former municipal landfill located in the City of Wilder (population 633), about three miles south of Newport, a suburb of Cincinnati, Ohio. The 39-acre site is bounded on the north and east by a small industrial park and on the west by the Licking River, a tributary of the Ohio River. About 250 feet downstream of the site is the main raw water intake for the Kenton County Taylor Mill water treatment plant, which serves about 75,000 consumers in the nearby counties. A stream on the south of the landfill drains to the Licking River.

The site was used by the City of Newport for disposal of residential and commercial wastes from the late 1940s until its closure in 1979. During this time, the City was cited for numerous permit violations including open burning, absence of daily cover, on-site ponding of water, uncovered refuse, presence of leachate, and handling hazardous waste without a permit. The landfill was closed in 1979 but the final closure plan was never fully implemented. Ownership was transferred to the Northern Kentucky Port Authority (NKPA) with the understanding that the NKPA would remediate the site.

NKPA activities included partial construction of collection trenches and landfill slopes. Although the NKPA made these initial remedial efforts, it lacked adequate funding to implement the agreed order with the State of Kentucky for closure. Subsequent site inspections indicated leachate breakouts containing lead, chromium, and PCBs, seeping into the Licking River. In 1984, the EPA placed the site on the NPL. A draft remedial investigation/feasibility study (RI/FS) was submitted in November 1986, and the ROD was signed March 27, 1987.

Description of Site Work

EPA initiated the RI investigation in 1985 and completed it in 1986. The major concern at the site was that leachate would migrate into the Licking River and the unnamed stream to the south and enter the raw water intake located across the Licking River. The RI assessed the nature and extent of on-site and off-site contamination, and evaluated exposure hazards to human health and the environment in the area surrounding the Newport Site. Specifically, the RI assessed the levels and pathways of ground-water contaminants, determined contaminant levels in the Licking River and the unnamed stream and in surface and subsurface soils, and evaluated the effect of leachate on aquatic organisms.

Results of the chemical analysis indicated that contaminant levels in the surface soils, surface water, and sediment downstream all were below accepted health criteria. However, the shallow on-site ground water, both immediately below the waste and at the banks of the Licking River and unnamed stream, contained above health base levels of some heavy metals and organics.

Description of Feasibility Study

The purpose of the FS, completed in late 1986, was to identify remedies to mitigate contamination at the dump site in order to remove potential risks to human health and the environment. Consideration of the remedial action alternatives took into account the CERCLA provisions that permanent solutions and treatment technologies be chosen to the maximum extent practicable, and that the remedy attain applicable or relevant and appropriate requirements (ARARs). The major ARARs considered were the Resource Conservation and Recovery Act (RCRA) requirements for ground-water cleanup, the Floodplain Management Executive Order, the Clean Water Act (CWA), the Occupational Safety and Health Act (OSHA), and EPA's Ground-water Protection Strategy.

In addition to "no action" and "no action with monitoring" alternatives, four remedial action alternatives were evaluated:

(1) Multi-media monitoring, leachate collection, regrading, and revegetation;

(2) RCRA capping the entire site, repairing the leachate collection system, and installing a gas collection and treatment system;

(3) Extensive excavation and solidification/stabilization that would require separation of waste material, backfilling, and regrading; and

(4) Excavation, disposal of waste in an off-site landfill, backfilling, regrading, and revegetation.

At a public meeting held in Newport during March 1987 the general concern was whether had EPA successfully determined the nature and extent of contamination and had considered practical alternatives to remedy the site.

Description of Selected Remedy

The selected alternative action (Alternative 1) required monitoring, leachate collection, regrading, and revegetation -- specifically, ground-water, surface-water and gas monitoring using monitoring wells and sampling uptakes, repair and replacement of the existing leachate collection system to prevent migration of leachate, and regrading of the landfill bank to prevent further erosion. The cost for this remedy was approximately one million dollars.

This alternative is cost-effective and protective, is expected to attain ARARs, and uses treatment technologies to the maximum extent practicable. Although this remedy does not include permanent treatment, it was considered economically viable and technically adequate due to the minimal contamination found in surface soil and ground-water discharge.

SODYECO SITE
CHARLOTTE, NORTH CAROLINA

HRS Score: 51.93 **NPL Rank: 151**

Background

The Sodyeco site is located on the Catawba River, 10 miles west of Charlotte, North Carolina. Approximately 20 to 30 people live within 1/4 mile of the site. Surface drainage from the west side of the site is directly discharged into the Catawba River. The 1,300-acre site contains an operational manufacturing facility consisting of production units and a wastewater treatment facility, which are currently owned by Sandoz Chemicals Corporation. The manufacturing facility began producing liquid sulfur dyes in 1936 under the ownership of Southern Dyestuff Company (Sodyeco) but now produces specialty chemical products for the agrochemical, electronic, explosive, lithographic, pigment, plastic, rubber, and general chemical industries. Waste materials were disposed of in on-site landfills, storage pits, and settling ponds.

In September 1980, organic solvents were detected in the facility's potable water well and in adjacent water supply wells. Residents of five homes were evacuated, and the facility water supply source was changed from ground water to the Catawba River. Results of a site investigation conducted by EPA in June 1982 revealed the presence of volatile organic contaminants (VOCs) in the ground water and surface water on the site. The site was placed on the NPL in December 1982 because of its proximity to potable water wells and the presence of two municipal water intakes on the Catawba River.

EPA and Sandoz signed a remedial investigation/feasibility study (RI/FS) consent agreement in February 1986. Because of the agreement, no potentially responsible party (PRP) search was necessary. The final RI report and a draft FS report were prepared by Sandoz under the consent agreement and released to the public in August 1987. The ROD was signed September 24, 1987.

Description of Site Work

The RI included soil, sediment, surface-water, and ground-water sampling at five different areas identified as sources of contamination. Results indicated that some portion of both the upper and lower aquifers had been contaminated with VOCs. As a result of volatilization and dilution, however, this contamination did not appear to have affected the Catawba River. Because the aquifers are not used for drinking water, potential risks to human health from exposure to on-site organic contaminants via inhalation, ingestion, and dermal contact are low under present use conditions at the site. There is potential for increased human health risks, however, if the ground water becomes a source of drinking water.

Description of Feasibility Study

The purpose of the FS conducted by Sandoz was to identify actions to mitigate contamination in soil and ground water and to reduce risks to human health and the environment. Remedial alternatives under consideration that passed initial screening were:

(1) No action; ground-water monitoring only;

(2) Ground-water recovery and treatment;

(3) Capping, soil excavation and incineration, and ground-water recovery and treatment;

(4) Capping, soil excavation and thermal stripping, and ground-water recovery and treatment;

(5) Capping, innovative soil treatment, excavation, and incineration, and ground-water recovery and treatment; and

(6) Capping, natural flushing, excavation, and incineration, and ground-water recovery and treatment.

Federal applicable or relevant and appropriate requirements (ARARs) under consideration included Maximum Contaminant Levels (MCLs) and MCL goals (MCLGs) under the Safe Drinking Water Act (SDWA); Water Quality Criteria (WQC) under the Clean Water Act (CWA); National Ambient Air Quality Standards (NAAQS) under the Clean Air Act (CAA); permitting and incineration standards under the Resource Conservation and Recovery Act·(RCRA); Hazardous Materials Transportation Act (HMTA) standards; Occupational Safety and Health (OSHA) planning requirements; National Pollutant Discharge and Elimination System (NPDES) standards for treated ground water; and North Carolina MCLs adopted from Federal SDWA standards.

During public meetings citizens expressed a desire for remedial action at the site. No public opposition is expected if the remedial alternative recommended below is implemented.

Description of Selected Remedy

The remedy recommended for the Sodyeco site included extraction, treatment, and discharge of ground water; possible soil excavation and off-site incineration; capping; and on-site treatment of contaminated soils left on site (Alternative 5). The innovative soil treatment technologies to be considered are flushing, soil washing, thermal processing, and *in situ* steam stripping. This recommended remedy permanently and significantly reduces the volume and mobility of contaminants in the soil and is expected to meet Federal and State ARARs. Long-term operation and maintenance of the asphalt cap and long-term ground-water monitoring will be required to ensure the effectiveness and permanence of the remedy.

GEIGER (C&M OIL) SITE
CHARLESTON COUNTY, SOUTH CAROLINA

HRS Score: 32.25 **NPL Rank: 640**

Background

The Geiger (C&M Oil) site is located in central Charleston County, about 10 miles west of the City of Charleston, South Carolina. The 5-acre site is located in a sparsely populated rural area that includes environmentally sensitive wetlands that are a critical habitat for several Federally-listed endangered and threatened species. The site, which was formerly used to incinerate waste oil, includes eight unlined lagoons constructed between 1969 and 1971 to hold waste oil prior to recycling and incineration.

In late 1971, in response to complaints from area residents, the South Carolina Pollution Control Authority (SCPCA) ordered that all incineration and waste disposal activities be stopped. After several serious oil spills in 1971 and 1974, the Charleston County Health Department closed the site and C&M Oil Distributors, Inc., purchased all reclaimable oil at the site. In 1982, the site was purchased by George Geiger, who filled in the lagoons with soil so that the site could be used to store equipment for his pile driving company.

The EPA, with aid from the South Carolina Department of Health and Environmental Control, initially investigated the site in February 1980. The waste oil was found to contain volatile organic compounds (VOCs), heavy metals, and PCBs. Although samples from two private wells upgradient from the site indicated no contamination, the ground water near the lagoons was found to contain heavy metals and VOCs. The site was included on the NPL in September 1983 and EPA assumed lead responsibility. Notice letters were sent out to potentially responsible parties (PRPs) in 1984; however, because no financially viable PRPs were identified, EPA initiated a Federal lead remedial investigation (RI) under Superfund in July 1985. The ROD was signed June 1, 1987.

Description of Site Work

The EPA initiated an RI in 1985 to determine the extent of contamination in the shallow aquifer and in the soil, and to determine whether contamination had migrated off site through surface-water runoff. The RI, completed in July 1986, determined that the soil was contaminated with lead, chromium, mercury, and PCBs; however, these contaminants did not appear to be migrating from the site. Lead, cadmium, VOCs, and other organic compounds were also found in the ground water beneath the site. Samples from local residential wells indicated that contaminants had not migrated into drinking water. However, a public health evaluation conducted as part of the RI concluded that contaminated ground water could potentially migrate toward residential wells and the sensitive wetlands.

Description of Feasibility Study

The cleanup objectives of the remedial action were to protect human health and environment from exposure to contaminated soils, prevent off-site movement of contaminated ground water, and restore contaminated ground water to levels protective of human health and the environment. The alternatives were divided into four groups: ground-water remediation, soil remediation, no action, and no action with monitoring alternatives. The following alternatives were considered in the feasibility study (FS):

(1) Ground-water extraction, air stripping, and disposal at privately-owned treatment works;

(2) Ground-water slurry wall and cap;

(3) Cap or vegetative or gravel cover over the area of highest soil contamination;

(4) Partial soil excavation, on-site disposal, and cap or vegetative cover; and

(5) Soil excavation and off-site disposal.

The major applicable or relevant and appropriate (ARARs) considered for this site were related to ground water. Ground water in the uppermost aquifer at the site is comparable to Class I water under the EPA Ground-water Protection Strategy (GWPS). The ground water is highly vulnerable to contamination; is a source of drinking water for nearby residents; and discharges into wetlands inhabited by endangered species, for example, the bald eagle, the wood stork, and the American alligator. Resource Conservation and Recovery Act (RCRA) regulations require a level of cleanup of contaminated water sufficient to achieve Maximum Contaminant Levels (MCLs). Other ARARs identified included the Safe Drinking Water Act (SDWA), Clean Water Act (CWA), National Pollutant Discharge Elimination System (NPDES), Endangered Species Act (ESA), and National Ambient Air Quality Standards (NAAQS) for incineration.

Description of Selected Remedy

Based on results of the investigations and the comments received from the public, EPA selected a remedy that includes pumping and on-site treatment of ground water and on-site thermal treatment of contaminated soil. This alternative meets CERCLA preferences for treatment by permanently and significantly reducing the volume of hazardous substances in the ground water and reducing the volume of contaminants in the soil. The remedy entails pumping water from the ground, applying treatment technologies appropriate to remove metals and VOCs, and discharging treated water into a nearby stream. All contaminated soil will be excavated, and organic contaminants destroyed in an on-site mobile thermal destruction unit. Inorganically contaminated soil will be treated through stabilization and solidification. Treated soil will be placed back into the excavated area.

INDEPENDENT NAIL COMPANY SITE
FIRST OPERABLE UNIT
BEAUFORT, SOUTH CAROLINA

HRS Score: 57.90 **NPL Rank: 62**

Background

The Independent Nail Company (INC) site is located near Beaufort, South Carolina, 40 miles northeast of Savannah, Georgia. From 1969 to 1980, the Blake and Johnson Company manufactured screws and fasteners on this 25-acre site. As part of its manufacturing process, the company discharged approximately 33,000 to 75,000 gallons per day of plating wastewater into an unlined infiltration lagoon. The wastewater contained organic cleaning solvents, phosphate, cyanide, chromium, cadmium, lead, mercury, nickel, zinc, copper, and iron.

In 1975, the South Carolina Department of Health and Environmental Control (SCDHEC) discovered that a break in the lagoon allowed wastewater to enter a drainage ditch located north of the lagoon. Further ground-water investigations by the State in 1975 and in 1980 indicated that concentrations of chromium and lead in the ground water exceeded drinking-water standards, and that cadmium, nickel, and zinc also were contaminating the ground water. The State took no action. In June 1980, INC purchased the plant and since that time has not discharged any wastewater into the lagoon. Additional sampling done in 1985, however, showed no metal contaminants at concentrations exceeding drinking-water standards.

EPA added the INC site to the NPL in September 1984 and assumed lead responsibility for the site. Although EPA initially determined that the site required no action, the SCDHEC stressed the seriousness of land disposal practices at the site due to its location in a major recharge zone. EPA divided the site into two operable units. The first operable unit addressed soil, surface-water, and sediment contamination; the second operable unit will address ground-water contamination. EPA completed the remedial investigation/feasibility study (RI/FS) for the first operable unit in July 1987 and signed the ROD on September 28, 1987. EPA initiated the RI/FS for the second operable unit in July 1987. Both the Blake and Johnson Company and INC were identified as potentially responsible parties (PRPs). A notice letter was sent to the PRPs but they declined to participate.

Description of Site Work

The RI, conducted from September through November 1986, determined the extent of contamination in the soil, surface water, and sediments on the site and in the drainage paths from the lagoon. The RI results indicated that soil contaminated with cadmium, chromium, nickel, and zinc, was found primarily in the lagoon, in areas within the fence, and in two areas outside the fence. Surface-water samples taken from the ditches showed that only zinc was present in detectable quantities. Samples taken from the lagoon revealed elevated levels of nickel and zinc. EPA detected high concentrations of cadmium, chromium, nickel, zinc, and cyanide in sediment samples taken at the same locations where surface-water samples were taken. An endangerment assessment indicated that the primary exposure pathway for cadmium, chromium, nickel, and zinc was through direct contact with surface soils and inhalation of airborne dust.

Description of Feasibility Study

The purpose of the FS for the first operable unit was to identify remedial actions to minimize soil and sediment contamination and prevent further contamination of ground water. Nine potential remedial alternatives were identified:

(1) No action;

(2) Soil washing and vegetative cover;

(3) Attenuation of soil contamination and vegetative cover;

(4) Solidification/stabilization of soils;

(5) Immobilization of soil by addition of clay and vegetative cover;

(6) Immobilization of soil by addition of lime and vegetative cover;

(7) Vegetative cover over lagoon area;

(8) Capping of lagoon area; and

(9) Off-site disposal of all contaminated soil.

Each alternative was evaluated against the CERCLA mandate of using permanent solutions and treatment technologies to the maximum extent practicable and the CERCLA criteria of effectiveness, implementability, and cost-effectiveness.

Applicable or relevant and appropriate requirements (ARARs) identified for the site were Occupational Safety and Health Act (OSHA) regulations, Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs), Clean Water Act (CWA), Endangered Species Act (ESA), Clean Air Act (CAA), and State Drinking-Water Standards.

EPA finalized a Community Relations Plan in January 1987. There were no requests from residents for a public meeting, and residents did not comment on the FS.

Description of Selected Remedy

The remedy EPA selected consists of treating contaminated soil by means of stabilization/solidification (Alternative 4). Following treatment, the soil/sediment will be placed in the excavated lagoon, covered with 6 inches of soil, and revegetated. The results of the ground-water investigation in the second operable unit will determine the necessity for long-term monitoring.

This alternative uses permanent treatment to reduce the mobility of the contamination. It is expected to be protective of human health and the environment and to attain ARARs.

PALMETTO WOOD PRESERVING SITE
DIXIANA, SOUTH CAROLINA

HRS Score: 38.43 **NPL Rank: 420**

Background

The Palmetto Wood Preserving (PWP) site is a decommissioned wood preserving facility located in the rural community of Dixiana, South Carolina, 6 miles southwest of Columbia. Wood treatment operations at the PWP site began in 1963; processes utilized there include a fluoride-chromate-arsenate-phenol process and an acid-copper-chromate process. In 1980, the new owners, Eastern Forest Products, switched to a chromate-copper-arsenate process.

During late 1981 and early 1982, the South Carolina Department of Health and Environmental Control (SCDHEC) received complaints of green liquids running off the PWP site and puddling on the adjacent property and roads during heavy rains. In response, SCDHEC inspected the PWP site and collected on-site soil and water samples. The soil was found to be contaminated with hazardous levels of chromium and pentachlorophenol (PCP).

In April 1983, copper and chromium were discovered during the drilling of a new drinking water well 200 feet from the site. As a result, SCDHEC issued a Consent Order requiring PWP to determine the extent of soil and ground-water contamination and to develop a plan for disposing of the contaminated materials. PWP's subsequent study confirmed soil and ground-water contamination beneath the main process area of the plant site. Plans for further investigations of the problem were developed by PWP's contractor but were never implemented. At the end of 1983, SCDHEC turned over responsibility for future work on PWP to EPA.

Notice letters were sent to potentially responsible parties (PRPs) in January 1985. Two PRPs were found but were judged not to be viable after a financial assessment. PWP ceased operations in 1985. The EPA lead remedial investigation (RI) was initiated in April 1986 and completed in January 1987; the feasibility study (FS) was completed in August, and the ROD was signed September 30, 1987.

Description of Site Work

The RI conducted by EPA revealed metal contamination in the soil, including elevated concentrations of chromium (2,200 ppm) and arsenic (6,200 ppm). Ground water below the site also is highly contaminated with copper, chromium, and arsenic, at levels above standards acceptable for drinking water. This metal contamination presents potential cancer risks through the following possible human exposure pathways: inhalation of contaminated dust; ingestion of contaminated soil; and drinking of contaminated ground water. Upon consultation with the Agency for Toxic Substances and Disease Registry (ATSDR), cleanup criteria for soils were set at 627 ppm for chromium and 200 ppm for arsenic.

PALMETTO WOOD PRESERVING SITE
DIXIANA, SOUTH CAROLINA

HRS Score: 38.43 **NPL Rank: 420**

Background

The Palmetto Wood Preserving (PWP) site is a decommissioned wood preserving facility located in the rural community of Dixiana, South Carolina, 6 miles southwest of Columbia. Wood treatment operations at the PWP site began in 1963; processes utilized there include a fluoride-chromate-arsenate-phenol process and an acid-copper-chromate process. In 1980, the new owners, Eastern Forest Products, switched to a chromate-copper-arsenate process.

During late 1981 and early 1982, the South Carolina Department of Health and Environmental Control (SCDHEC) received complaints of green liquids running off the PWP site and puddling on the adjacent property and roads during heavy rains. In response, SCDHEC inspected the PWP site and collected on-site soil and water samples. The soil was found to be contaminated with hazardous levels of chromium and pentachlorophenol (PCP).

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Description of Feasibility Study

The FS, completed by EPA in August 1987, listed the following cleanup objectives: to protect against exposure to contaminated on-site soils; to prevent off-site movement of contaminated ground water; and to restore contaminated ground water to protective levels. Based on these objectives, the following alternatives were developed and evaluated:

(1) **Alternatives for Ground-water Remediation:**

- Slurry wall and impermeable cap;
- Slurry wall with an encapsulation cell;
- Ground-water extraction, filtration, ion exchange, and off-site discharge;
- Ground-water extraction, reduction, precipitation, filtration, and off-site discharge;
- Ground-water extraction, filtration, ion exchange, precipitation, filtration, and off-site discharge; and
- No action;

(2) **Alternatives for Soil Remediation:**

- Surface capping;
- On-site containment/encapsulation;
- Extraction/soil flushing;
- Excavation and off-site disposal; and
- No action.

The following applicable or relevant and appropriate requirements (ARARs) were identified: Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs); National Pollutant Discharge Elimination System (NPDES) regulations; Resource Conservation and Recovery Act (RCRA) excavation and soil flushing regulations; Federal and State ambient air quality standards; and State drinking water standards.

At a public meeting to discuss the remedial alternatives developed in the FS, the public expressed support for treatment of ground water and flushing of contaminated soil.

Description of Selected Remedy

The selected remedy will consist of the following activities:

- Extraction of contaminated ground water, treatment on site to achieve SDWA MCLs, filtering, and discharge off site;

- Installation of a municipal water line or the drilling of new wells for nearby residents;

- Excavation of contaminated soils;

- On-site flushing of soil with an acidic water solution to remove arsenic and chromium;
- Removal of heavy metal ions in soil through ion-exchange treatment;
- Testing for decontaminant verification;
- Pumping of flushing solution to an on-site water treatment facility for processing and recirculation through soil; and
- Transport of treated soil back to excavated area, where natural aeration will be supplemented with tilling and compaction.

This remedy is expected to permanently and significantly reduce the volume and/or mobility of contaminants in the soil and ground water, and is cost-effective in comparison with other alternatives. The State of South Carolina concurred with the selected remedy, but pointed out that its funds for cost sharing are limited. Although the State presently has funding to cover its part of this remedial action, it is concerned about funding problems on future remedial actions at other NPL sites in the State.

JOHNS-MANVILLE SITE
WAUKEGAN, ILLINOIS

HRS Score: 38.20 **NPL Rank: 428**

Background

The Johns-Manville disposal site is located near the City of Waukegan, along Lake Michigan, in northeastern Illinois. There are approximately 200 homes within 1 mile of the western edge of the site. The site covers approximately 120 acres of land that is owned by the Manville Services Corporation (previously the Johns-Manville Sales Corporation). The Manville Services Corporation produces a wide range of building materials. Waste materials from the Manville plant have been disposed of in pits on the site since 1922; wastes present include asbestos, lead, chrome, thiram, and xylene. An asbestos disposal pit, a sludge disposal pit, and other miscellaneous disposal pits still are active. Materials from the Manville wastewater treatment system were also settled out in unlined ponds and waterways at the site and periodically transferred to the sludge disposal pit.

A 1982 study by EPA indicated that concentrations of asbestos fibers ranging in size from 2.5 to 15 micrometers were present at the site and downwind of the site, and asbestos fibers of a size less than 2.5 micrometers were also present on site in elevated concentrations. The site was listed on the NPL in December 1982. Enforcement negotiations with the potentially responsible party (PRP), the Manville Services Corporation, were completed in May 1987. The ROD was signed June 30, 1987.

Description of Site Work

The EPA lead remedial investigation (RI) at the site was completed in July 1985 and included sampling of air, ground water, soil, and the waters of Lake Michigan. The RI indicated that concentrations of asbestos fiber exceeded applicable health-based water quality criteria at all ground-water and surface-water sampling locations. An air quality survey for lead and total suspended particulates (TSP) indicated that air emissions from the site were a potential problem. In addition, elevated levels of metals were found in the soils. The results of the RI indicated the need to take action to prevent the release of asbestos and TSPs into the air, and the need to monitor and, if necessary, remediate contaminants in the site ground water and in Lake Michigan.

Description of Feasibility Study

EPA completed the feasibility study (FS) in January 1987. The objectives of the remedial action were to ensure that: (1) releases of asbestos to air were eliminated and that releases of other contaminants to the air are mitigated; (2) direct contact with waste materials and soils was minimized or eliminated; and (3) concentrations of contaminants in ground water and surface water exceeding standards for human health and aquatic life were detected and effectively remediated.

An initial screening process narrowed the alternatives to the following:

(1) No action;

(2) Grading and seeding of the waste materials and soils, closure of the asbestos pit, and air emissions contingency plans;

(3) Soil covering with vegetation, placement of riprap or new soil on slopes of the settling basins and waste disposal area, closure of asbestos disposal pit, and air emissions contingency plans;

(4) On-site landfilling, including installation of a multi-layer liner, multi-layer cap, and collection and treatment of leachate and runoff; and

(5) Off-site landfilling, including removal and disposal of soils in a landfill.

All alternatives included a ground-water detection monitoring system and a ground-water/surface-water contingency plan.

Applicable or relevant and appropriate requirements (ARARs) included the Clean Air Act (CAA) National Emission Standards for Hazardous Air Pollutant (NESHAP) requirements and National Ambient Air Quality Standards (NAAQs), the Clean Water Act (CWA), Illinois Water Quality Standards, the Safe Drinking Water Act (SDWA), the Great Lakes Water Quality Agreement of 1978, the U.S. EPA Ground-water Protection Strategy, the Resource Conservation and Recovery Act (RCRA), the Occupational Safety and Health Act (OSHA), and other State of Illinois requirements.

Approximately 20 people attended a public meeting in February 1987 to discuss the RI/FS. Ten individuals and organizations submitted comments during the public comment period on the FS. The Manville Sales Corporation submitted comments disagreeing with the proposed thickness of the cover. Other commenters expressed concern about funding for a cleanup, the use of the property after cleanup, the degree of endangerment, and the public health effects presented by the site.

Description of Selected Remedy

The recommended alternative contained multiple approaches, including grading and covering of the waste materials and soils at the site, and installing a cover of vegetation. The active disposal pits will continue to operate but the asbestos pit will be closed in June 1989 and covered. Riprap will be placed on the slopes of the settling basins to prevent erosion, and a ground-water and surface-water detection monitoring system will be established on site to detect any leaching of contaminants. In addition, an air monitoring system will be used to determine whether the remedy reduces airborne contaminant levels. Miscellaneous remedies, such as the cleanup of debris, fencing, and the posting of signs, also will be instituted.

The State of Illinois concurred with the selected remedy. In response to public comments, an air monitoring program, an associated contingency plan, and a sampling plan for active waste disposal areas on site were added to the recommended alternative.

The alternative is expected to meet the ARARs for the site. Presently, the site achieves the NAAQs for lead. However, initial grading and construction at the site may temporarily generate levels of contaminants above the NAAQ standards. Soil covering should reduce the contaminant levels in Lake Michigan below EPA Ambient Water Quality Criteria and Illinois Water Quality Standards. Additionally, the alternative fulfills the CERCLA preference for a permanent remedy.

ENVIRO-CHEM CORPORATION/ NORTHSIDE SANITARY LANDFILL
ZIONSVILLE, INDIANA

ECC HRS Score: 46.44	**ECC NPL Rank: 240**
NSL HRS Score: 46.04	**NSL NPL Rank: 249**

Background

The Enviro-Chem Corporation (ECC) and the Northside Sanitary Landfill (NSL) sites are located in a rural area of Indiana, 10 miles northwest of Indianapolis. ECC, a former solvent processing and reclaiming facility, occupies about 7 acres immediately west of NSL, a 70-acre landfill containing both hazardous and non-hazardous wastes. Farmland borders the sites and about 50 residences are located within a mile of the sites. Finley Creek, which flows along the eastern and southern edge of the NSL site, eventually feeds into a reservoir supplying approximately 6 percent of the drinking water for the City of Indianapolis.

ECC began operations in 1977 involving the recovering, reclaiming, and selling of primary solvents, oils, and other industrial wastes. ECC was permitted to dispose of still bottoms and oily wastes at NSL. Accumulation of contaminated storm water, poor management of drum inventory, and several spills prompted EPA and State investigations of the ECC site. In 1981, after a number of violations, the Boone County Circuit Court issued a Consent Decree prohibiting ECC from using the NSL for disposal of wastes. ECC failed to satisfy the Consent Decree and was ordered to stop operations. In August 1982, ECC was found to be insolvent. From 1983 to 1984, surface contaminants were removed from the site and treated. The ECC site was listed on the NPL in September 1983.

The NSL site began operations sometime before 1960 and was first ordered to cease operations in 1974 due to reported operational deficiencies. Use resumed and reports of disposal of unapproved waste at NSL continued through the late 1970s. In 1980, the owner filed a Resource Conservation and Recovery Act (RCRA) Part A application and operated as an existing hazardous waste disposal facility until November 1985 when EPA denied a RCRA Part B application. The NSL site was placed on the NPL in September 1984. In February 1987, after a series of investigations, the Indiana Solid Waste Management Board ordered NSL to accept no additional solid waste except that needed to contour the site. NSL has appealed and the results of the hearing are not known at this time.

Because similar remedial actions are required at both sites, a joint ROD was signed on September 25, 1987. One thousand potentially responsible parties have been identified and three steering committees exist to organize the effort: (1) ECC settlors (1983 Decree), (2) ECC non-settlors, and (3) NSL Steering Committee. The landfill owner represents himself as a separate entity. EPA will be seeking cleanup funds and reimbursement for previously incurred costs. The ECC settlors have been released from responsibility for most previously incurred costs and half of the remedial investigation/feasibility study (RI/FS) costs.

Description of Site Work

Emergency actions at the ECC site have eliminated major surface sources of contamination. The contamination remaining in the soil includes volatile organic chemicals (VOCs), polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). The EPA lead RI, completed in 1986, also indicated organic contamination in the ground water off site. Ground-water contamination appears in a glacial till water-bearing unit below the site due to leaching.

As of April 1987, NSL was continuing to operate as a solid waste landfill. The RI for that site revealed contamination in the subsurface soil, surface water and sediments, leachate, and ground water. Contaminants include volatile organics, oil and grease, inorganics, and pesticides.

Description of Feasibility Study

Although a separate FS was conducted for each site, a third report, entitled "Combined Alternatives Analysis (CAA) Report, NSL and ECC," was prepared to discuss a combined remedy. Remedial goals were identified for each medium: soil and landfill contents, landfill leachate, ground water, surface water, and sediment. The goals were to minimize direct contaminant contact, control migration to ground and surface water, and minimize contaminant consumption. Nine alternatives were evaluated:

(1) No action;

(2) Soil cover and leachate collection and treatment with access restrictions;

(3) RCRA cap and leachate collection and treatment, with access restrictions;

(4) Soil cover, leachate collection, ground-water interception and treatment, with access restrictions;

(5) RCRA cap, leachate collection, ground-water interception and treatment, with access restrictions;

(6) RCRA cap, leachate collection, ground-water isolation and treatment, with access restrictions;

(7) RCRA cap, leachate collection, ground-water isolation and treatment, ECC soil vapor extraction, with access restrictions;

(8) RCRA cap, leachate collection, ground-water isolation and treatment, ECC soil incineration, with access restrictions; and

(9) On-site RCRA landfill with access restrictions.

The alternatives were evaluated for compliance with CERCLA cleanup goals, including preference for treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances. The evaluation considered the following applicable or relevant and appropriate requirements (ARARS): RCRA closure and post-closure requirements; Indiana closure and post-closure requirements; State of Indiana Water Quality Criteria; RCRA and Indiana Environmental Management Act measures to prevent releases of contaminants; RCRA requirements for corrective action; RCRA ground-water protection standards and concentration limits; the Clean Water Act (CWA) National Pollutant Discharge Elimination System (NPDES); Executive Orders 11988 and 11990 for Floodplain Management and Protection of Wetlands; and the Indiana Department of Natural Resources Flood Control Act.

Description of Selected Remedy

EPA's recommended alternative (Alternative 5) includes a RCRA-compliant cap and surface controls, monitoring, leachate collection, ground-water interception and treatment, and access restrictions. The selected remedy is consistent with the CERCLA goal of mitigating and minimizing threats to human health and the environment. The selected remedy is expected to attain ARARs identified for the two sites. Public comments received on the FS and the CAA Report indicated residents were concerned that a permanent remedy be introduced as soon as possible at the sites. The State of Indiana concurred with the selected remedy.

MARION/BRAGG LANDFILL SITE
SOURCE CONTROL OPERABLE UNIT
MARION, INDIANA

HRS Score: 35.25 **NPL Rank: 530**

Background

The Marion/Bragg Landfill, located just outside the city limits of Marion, Indiana, 65 miles northeast of Indianapolis, was used as a sand and gravel quarry from 1935 until approximately 1961. From 1949 through 1970, Radio Corporation of America (RCA) leased and used portions of the site for industrial refuse disposal. Concurrently, from 1957 to 1975, Bragg Construction leased and used the site as a municipal landfill. Indiana State Board of Health (ISBH) inspections indicated that the landfill was operated in an unacceptable manner, although ISBH never formally closed the site. Flammable drummed waste often was emptied and mixed with the landfill wastes, causing fires. Drums allegedly were rinsed and resold. Other violations included lack of daily cover, burning of waste, and pond encroachment.

Notice letters were issued to potentially responsible parties (PRPs), including Mr. Delmar Bragg, General Plastics Corporation, RCA, the City of Marion, and the Marion Utility Services Board, and a meeting was held in November 1985 to provide the PRPs an opportunity to work cohesively and to respond to EPA's work plan. In December 1985, Enforcement and Regional Counsel determined that EPA should initiate the remedial investigation/feasibility study (RI/FS). Little or no interaction has occurred with the PRPs since that time. The RI/FS was completed in July 1987, and the ROD was signed September 30, 1987. An interim remedy for source control was selected for this site pending further ground-water studies.

Description of Site Work

EPA initiated the RI in March 1985 and completed it in June 1987. Results indicated that surficial soils at the site were contaminated with Bis (2-ethylhexyl) phthalate, cadmium, lead, mercury, and several polycyclic aromatic hydrocarbons (PAHs). Two leachate seeps at the site were contaminated with arsenic and other inorganic metals. PAH and arsenic contamination in the leachate seep exceeded levels acceptable for direct contact (1×10^{-6}).

Ground water beneath the site was contaminated with benzene, trichloroethylene, and arsenic at levels above Clean Water Act (CWA) Water Quality Criteria (WQC) for human health. Other ground-water contaminants included phthalate, ammonia, barium, and some heavy metals. The Mississinewa River, the major receptor of ground water from the site, was found to be contaminated with ammonia at levels above Indiana WQC. In addition, on-site ground water contained ammonia at levels that have the potential to harm aquatic life in the river.

Description of Feasibility Study

The FS, completed by EPA in July 1987, identified the following remedial action goals for the site: (1) minimize risk from direct contact with PAH-contaminated surface soils and the on-site pond; (2) minimize migration of arsenic and other contaminants in leachate seeps and surface soils to ground water and off-site surface water; (3) minimize risk from direct consumption of contaminated ground water; and (4) minimize migration of contaminated ground water to surface water. Based on these goals, the following remedial alternatives were developed and analyzed:

(1) Installation of an Indiana Sanitary Landfill Cap (a 2-foot clay-type cap and 6 inches of top-soil), construction of a flood protection levee around the 100-year floodplain, monitoring of ground and surface waters, and deed restrictions on use of shallow drinking water wells;

(2) Installation of a Resource Conservation and Recovery Act (RCRA)-compliant cap (and all the components of Alternative 1);

(3a) Installation of a slurry wall, ground-water pumping, and on-site treatment (and all the components of Alternative 1);

(3b) Installation of a slurry wall, ground-water pumping, and off-site discharge to local treatment plant (and all the components of Alternative 1);

(4a) Similar to Alternative 3a, except construction of a RCRA-compliant cap rather than a sanitary cap;

(4b) Similar to Alternative 3b, except construction of a RCRA-compliant cap rather than a sanitary cap; and

(5) No action.

The following applicable or relevant and appropriate requirements (ARARs) were identified for the site: Indiana Sanitary Landfill requirements, the Indiana Floodplains Control Act, Indiana WQC, and RCRA surface-water monitoring requirements.

Description of Selected Remedy

In the remedy selection process, EPA decided that additional ground-water studies were needed in order to select a ground-water remedy that assures protection of human health. Therefore, the ground-water treatment alternatives (3a, 3b, 4a, and 4b) were deferred, and Alternative 1 was selected as an interim remedy. In concurrence with the execution of the interim remedy, EPA will conduct fish-sampling, ground-water release studies, and ground- and surface-water monitoring.

The selected remedy is implementable and cost-effective. Long-term effectiveness and permanence will be evaluated best when the ground-water remediation is completed. Permanent treatment-based solutions, particularly incineration alternatives, were considered but screened out due to technical and cost considerations. Such alternatives would take 25 to 100 years to complete, at a cost of $404 million to $3.4 billion.

SEYMOUR RECYCLING CORPORATION SITE
SEYMOUR, INDIANA

HRS Score: 58.15 **NPL Rank: 57**

Background

The Seymour Recycling Corporation (SRC) site is located 2 miles southwest of Seymour, Indiana, in an area used primarily for agriculture. From approximately 1970 to early 1980, SRC and its corporate predecessor, Seymour Manufacturing Company, processed, stored, and incinerated chemical wastes at the site.

In March 1980, 100 homes were evacuated after a chemical reaction released toxic fumes from the facility. The facility was subsequently closed due to failure to comply with the terms of a 1978 agreement with the State of Indiana to improve waste management practices and to cease receiving wastes. In May 1980, the United States filed suit against the owners and operators of the site. Two potentially responsible parties (PRPs) removed several thousand drums from the site, and EPA took action to restrict access and control runoff. In 1981, EPA removed chemicals from tanks at the site and disposed of those wastes at authorized disposal sites. In the Fall of 1982, the United States and certain companies that allegedly sent waste to the site reached a settlement agreement. Under the terms of the consent decree, the settling defendants removed accumulated wastes and contaminated soil from the site.

From 1982 to 1984, EPA and the State conducted a surface cleanup, removing drums, tanks, and soil for off-site disposal. Preliminary sampling efforts indicated that over 70 potential carcinogens, teratogens, mutagens, and acute and chronic toxicants were present in the soil, surface water, and ground water at the SRC site.

A case management order was issued in 1984 for negotiations between the defendants and the EPA. There are approximately 60 defendants, currently named by the United States in the ongoing suit, who have, in turn, introduced 60 additional third-party defendants. EPA initiated a Remedial Investigation (RI) that was completed in May 1986. A Phased Feasibility Study (PFS) that evaluated the stabilization of the ground-water contamination plume emanating from the site was completed in August 1986. The ROD was signed September 4, 1987. Negotiations with PRPs are ongoing.

Description of Site Work

In 1983, EPA initiated an RI to determine the nature and extent of potential hazards remaining at the site. The endangerment assessment estimated potential impacts on human health and the environment. The RI identified the following as major risks associated with the site: 1) off-site migration of volatile organic compounds (VOCs); 2) potable use by humans of shallow, contaminated ground water on site; 3) exposure of humans to contaminants in on-site soils through site use; and 4) on-site and off-site exposure of terrestrial and aquatic organisms to contaminants from the site.

EPA collected soil samples during 1984 and 1985 to determine the extent of the contamination of the soil. Additional sampling was conducted by the U.S. Fish and Wildlife Service between 1983 and 1985. Ground-water monitoring conducted at the SRC site by EPA and various contractors detected the presence of a ground-water contaminant plume containing a high concentration of VOCs. In addition, analyses of tissues from animals captured in the area surrounding the SRC site indicated that some contamination from the site migrated to surrounding land areas and surface waters.

Description of Feasibility Study

The PFS was completed in 1986 to evaluate the stabilization of the ground-water plume. Remedial alternatives under consideration in the PFS were:

(1) No action;

(2) Off-site soil disposal and ground-water extraction and treatment;

(3) On-site soil disposal and ground-water extraction and treatment;

(4) On-site soil incineration and ground-water extraction and treatment;

(5) Multi-media soil cap and ground-water extraction and treatment;

(6) *In-situ* soil washing, multi-media cap, and ground-water extraction and treatment; and

(7) Vapor extraction, multi-media cap, and ground-water extraction and treatment.

Federal applicable or relevant and appropriate requirements (ARARs) considered included Maximum Contaminant Levels (MCLs), MCL goals (MCLGs), and health advisories under the Safe Drinking Water Act (SDWA); MCLs, Alternate Concentration Limits (ACLs), and background levels under the Resource Conservation and Recovery Act (RCRA); verified reference doses (RFDs) for noncarcinogens developed by an intra-agency EPA workgroup; carcinogen potency factors (PFs) developed by EPA; and Water Quality Criteria (WQC) under the Clean Water Act (CWA). Indiana State ARARs considered included narrative and non-degradation water quality standards, and numerical drinking water standards for public water supplies. Other State standards considered were closure and post-closure requirements and land disposal restrictions under RCRA.

The community of Seymour, Indiana, has been concerned about the SRC site since 1976. The city used a court-held trust fund established as part of a 1983 settlement between EPA and several PRPs to extend the city's municipal water system to the subdivision on which the site is located. At a public meeting held by EPA on the October 9, 1986, Seymour community participants expressed the desire that remedial action be implemented as soon as possible.

Description of Selected Remedy

The remedy selected for the SRC site was a modification of the seventh alternative listed above: soil vapor extraction, multi-media cap, and ground-water extraction and treatment. The soil vapor extraction system selected will remove a substantial amount of the VOCs present in the soil. The application of soil nutrients will stimulate biodegradation of the remaining non-volatile organic compounds remaining in the soil. Construction and maintenance of a multi-media cap will provide protection from direct contact with the remaining contaminants, reducing the cancer health risk to humans from direct contact with soil on site and reducing soil exposure risk for terrestrial animals. Capping will also prevent the small concentrations of slow-moving VOCs remaining in the soil from further contaminating the ground water. The ground-water pumping and treatment system will remove nearly all of the VOCs in the ground water, reduce the cancer risk to humans, and also prevent further contamination of the ground water. As described above, the selected remedy employs permanent solutions and treatment technologies and is expected to satisfy ARARs.

LIQUID DISPOSAL INC., SITE
UTICA, MICHIGAN

HRS Score: 63.28 **NPL Rank: 24**

Background

Liquid Disposal Inc., (LDI) is a 6.5-acre site located about 20 miles north of Detroit in a residential and light industrial area. The site is bordered by the Clinton River and its floodplain and by a nature study area. LDI operated from 1968 to 1982 as a commercial incinerator of liquid waste. Major features of the site include a high-temperature incinerator, a waste liquid lagoon, a scrubber water lagoon, and numerous above- and below-ground storage tanks.

LDI was closed in 1982 when two workers were killed in an industrial accident. Since that time, EPA has completed four immediate removal actions to respond to hazardous substances and waste stored in the waste oil lagoon, storage tanks and drums, scrubber lagoon, and ash sludge piles. As a result of these actions, there no longer are surface waste sources at the site. However, waste sample jars and old equipment and containers do remain at the site. The on- and off-site soil and ground water in the upper aquifer is contaminated both by organic and inorganic chemicals, including PCBs, lead, trichloroethylene, benzene, toluene, and phenol.

In September 1983, the Michigan Department of Natural Resources (MDNR), through a cooperative agreement with EPA, initiated the remedial investigation/feasibility study (RI/FS). The final RI was completed in May 1987, the FS report was completed in August 1987, and the ROD was signed September 30, 1987. EPA has identified approximately 850 potentially responsible parties (PRPs) for the LDI site. Notice letters pursuant to CERCLA have been sent to all known PRPs. EPA's National Enforcement Investigation Center has compiled information received from PRPs into a draft transactional data base. A PRP Steering Committee has been organized, and EPA is currently negotiating with PRPs to have them conduct the remedial action.

Description of Site Work

The State lead RI investigated contamination of the soil and ground water. Results indicated that on-site concentrations of the contaminants generally are higher than off-site concentrations.

Although there are no current users of ground water downgradient from the site, the effects of LDI on the bedrock aquifer also were investigated. Potential sources of aquifer contamination included leaks from the injection well, migration of contaminants from the surface reaching the aquifer through a poorly sealed well, and natural causes. There is strong evidence that surface contaminants have only a slight chance of migrating through an underlying clay layer. The high levels of downgradient contaminants are not believed to originate from the site; thus, the ROD only addresses upper aquifer contamination.

The RI also included an endangerment assessment and exposure assessment. Possible routes of exposure that pose health risks include direct contact with soils and leachate, and ingestion of the ground water. In addition, there is potential risk to the Clinton River due to acute or chronic contamination of the organisms in the wetlands.

Description of Feasibility Study

The FS, completed by the State in August 1987, evaluated remedial treatment and containment technologies. Remedial alternatives were developed from the technologies that met the criteria of achieving response objectives, controlling or treating the chemicals present at the site, being applicable to the site conditions, and meeting performance, reliability, and implementability standards. Seven alternatives were evaluated in detail:

(1) No action;

(2) On-site land disposal of equipment and debris, construction of a slurry wall and impermeable cap containment system, and an air-stripping ion exchange ground-water extraction and treatment system;

(3) Off-site disposal of equipment and debris at a sanitary landfill, off-site land disposal of soil at a Resource Conservation and Recovery Act (RCRA) landfill, and installation of an activated carbon ground-water extraction and treatment system;

(4) Off-site disposal of debris and equipment at a sanitary landfill, on-site incineration of soil and waste, and installation of an ultraviolet ozonation, flocculation, and precipitation ground-water extraction and treatment system;

(5) Off-site disposal of debris and equipment at a sanitary landfill, vacuum extraction combined with solidification and fixation of the soil and waste, and air stripping and ion exchange ground-water extraction and treatment;

(6) Off-site disposal of debris and equipment, on-site biodegradation and solidification and fixation of soil and waste, and biological ground-water treatment with flocculation and precipitation; and

(7) On-site land disposal of the debris and equipment, on-site solidification and fixation of the soil and waste, on-site ground-water extraction and treatment using air stripping and ion exchange technology, and construction of a slurry wall and impermeable cap system.

Major State and Federal applicable or relevant and appropriate requirements (ARARs) included RCRA, the Occupational Safety and Health Act (OSHA), the Clean Water Act (CWA), and the Toxic Substances Control Act (TSCA). State ARARs included the Michigan Hazardous Waste Management Act, the Michigan Solid Waste Act, the Michigan Air Pollution Act, and the Michigan Water Resources Commission Act.

Community involvement at the site included public meetings held at regular intervals throughout the RI/FS process. At the request of several PRPs, the public comment period on the FS was extended. Community concerns at an August 1987 public meeting addressed the solidification and fixation process because the short-term impacts from them may include toxic air emissions.

Description of Selected Remedy

The recommended remedy is Alternative 7. Other alternatives were eliminated for not meeting the CERCLA preferences for treatment and the required compliance with ARARs. The alternative chosen is the most cost-effective and is designed to meet all ARARs. Hazardous substances in the soil will be solidified to reduce their mobility and toxicity; however, they will not be destroyed permanently. Accordingly, the site will be reviewed under CERCLA section 121(c) every 5 years to ensure that the remedy continues to be protective. The alternative chosen has been endorsed by the State.

Major State and Federal applicable or relevant and appropriate requirements (ARARs) included RCRA, the Occupational Safety and Health Act (OSHA), the Clean Water Act (CWA), and the Toxic Substances Control Act (TSCA). State ARARs included the Michigan Hazardous Waste Management Act, the Michigan Solid Waste Act, the Michigan Air Pollution Act, and the Michigan Water Resources Commission Act.

Community involvement at the site included public meetings held at regular intervals throughout the RI/FS process. At the request of several PRPs, the public comment period on the FS was extended. Community concerns at an August 1987 public meeting addressed the solidification and fixation process because the short-term impacts from them may include toxic air emissions.

Description of Selected Remedy

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ROSE TOWNSHIP DUMP SITE
OAKLAND COUNTY, MICHIGAN

HRS Score: 50.92 **NPL Rank: 166**

Background

The Rose Township Dump site covers 110 acres in a wetland area in rural Rose Township, Oakland County, Michigan. After being farmed in the 1950s, the site was used illegally as a dump. Operators placed an estimated 5,000 drums on one portion of the site, contaminated other areas with lead battery sludges, and discharged bulk waste onto the soil surface and into shallow pits.

In 1968, the Oakland County Health Department (OCHD) was notified of the illegal dumping. Over the next several years, a number of legal actions were unsuccessfully brought against the waste hauler and property owner. In 1979, the Michigan Department of Natural Resources (MDNR) sampled drums and domestic wells at the site. The results prompted the State Toxic Substance Control Commission to declare an emergency and to remove more than 5,000 drums of contaminants from the site. In 1980 and 1982, MDNR conducted hydrogeologic studies of the site by installing monitoring wells and taking soil samples. These initial investigations indicated that organic chemical contamination extended below the shallowest aquifer and that additional information was necessary to define the extent of the contamination.

The site was placed on the NPL in 1982. In October 1982, EPA notified seven potentially responsible parties (PRPs) of their potential liability and of EPA's intent to conduct a remedial investigation/feasibility study (RI/FS) at the site. Upon completion of the RI/FS in 1986, EPA issued special notice letters to 29 PRPs and held an informational meeting with 11 PRP representatives on July 17, 1987. The ROD was signed September 30, 1987. Negotiations have been held and a good faith offer from the PRPs was due in late 1987.

Description of Site Work

The purpose of the RI was to assess site conditions, chemical contaminant distribution, and environmental and health risks at the site. Results of the RI indicated that ground water, surface soils, and adjacent wetlands were contaminated. Contaminants of concern found on the site were lead, zinc, PCBs, and volatile and semi-volatile organic compounds (VOCs). Ground water was contaminated with several metals, including lead, iron, and zinc, and sampling results identified two ground-water contamination plumes containing vinyl chloride, xylene, toluene, and benzene. The principal threat to surrounding communities is from potential contamination of nearby wells, the nearest of which is 1,600 feet from the site. Although access to the site is restricted, hunters, snow mobile riders, and the abundant wildlife on site are at risk from potential exposure to high surface soil contamination. There is also a threat to surrounding wetlands via drainage pathways.

Description of Feasibility Study

The FS identified three specific areas of concern: ground-water plumes; soil contamination; and drainage pathways to the wetlands. Following an initial screening, five remedial alternatives were compiled:

(1) No action, except for monitoring;

(2) Excavation of contaminated soils, with off-site land disposal;

(3) Excavation, with on-site thermal destruction of organics and on-site disposal of ash;

(4) Excavation, with soil aeration to remove VOCs and off-site land disposal of metals and PCBs; and

(5) Impermeable capping of site with *in-situ* vacuum extraction of VOCs.

Each remedial alternative included extraction and treatment of ground water by air stripping and carbon absorption.

Major Federal and State applicable or relevant and appropriate requirements (ARARs) identified for the site included: Maximum Contaminant Levels (MCLs) and the proposed Maximum Contaminant Level Goals (MCLGs) for chlorobenzene under the Safe Drinking Water Act (SDWA); substantive requirements of the Resource Conservation and Recovery Act (RCRA) and Michigan Act 64 concerning treatment and storage of contaminants on site; RCRA regulations concerning design, construction, operation, and maintenance of incinerators; and Toxic Substance Control Act (TSCA) requirements for disposal of PCB-contaminated soil.

A public comment period for the RI/FS began on June 29, 1987, and was extended beyond its 30-day deadline to August 27, 1987, in response to public request. A public meeting was held on July 1, 1987, to discuss the proposed remedial plan. The public supported the remedy selected (discussed below).

Description of Selected Remedy

The preferred remedial action alternative consisted of soil excavation, on-site thermal destruction of contaminants, ground-water extraction and treatment, and site fencing and monitoring (Alternative 3). Of the alternatives considered, only the selected remedy is expected to satisfy all ARARs and provide for permanent destruction of contaminants. Contaminated soils will be excavated and incinerated to remove the risk of direct contact and further ground-water contamination. Existing contaminants will be removed from ground water so that the aquifer will be of potential use for potable water in 6 to 10 years.

An infrared incinerator will be used in a pilot test to destroy contaminants on site. This technology was chosen because it is demonstrated to have destruction and removal efficiencies of 99.9999+ 0/0 for wastes with elevated PCB concentration and to "fix" heavy metals into the resulting ash. Also, it is estimated that the infrared unit will have lower associated costs than a rotary kiln incinerator. If the resultant ash passes EP toxicity test, it will be backfilled on site. If not, it will undergo further treatment before burial.

FMC CORPORATION
GROUND-WATER OPERABLE UNIT
FRIDLEY, MINNESOTA

HRS Score: 65.50 **NPL Rank: 17**

Background

The FMC site is located in Fridley, Minnesota, just north of Minneapolis. The site lies approximately 1,000 feet east of the Mississippi River, one-half mile upstream from Minneapolis' drinking water intake, which serves about 500,000 people. The site is divided into several sections, including the 13-acre FMC lands and the 5-acre Burlington Northern Railroad (BNR) lands. Both are located immediately south of the FMC Ordnance manufacturing complex. The Naval Industrial Reserve Ordnance Plant (NIROP) is located directly north of the FMC and BNR lands.

From 1941 to 1964, Northern Ordnance, Inc., operated a naval ordnance manufacturing complex, later purchased by FMC. From approximately 1945 to 1969, the FMC and BNR lands south of the complex were used for the incineration and disposal of paint, oils, solvents, and other substances. In 1980, the Minnesota Pollution Control Agency (MPCA) received a complaint regarding past disposal at the BNR lands. MPCA required FMC to investigate both the FMC and BNR lands. The FMC investigation revealed that past disposal had resulted in contamination of ground water and of the Mississippi River.

The FMC site was proposed for inclusion on the NPL in 1982. Under a 1983 Consent Order with EPA, FMC excavated and contained contaminated soil and initiated a remedial investigation/feasibility study (RI/FS) to evaluate alternatives for a ground-water remedy. The final FS for the ground-water operable unit was completed in 1985, and the ROD was signed September 30, 1987. The U.S. Department of the Navy is conducting a separate RI/FS to address the NIROP manufacturing facility and surrounding area.

Description of Site Work

The RI indicated that ground water beneath the FMC and BNR lands is contaminated with trichloroethylene (TCE), benzene, toluene, and other volatile organic compounds (VOCs). Because ground water at the site discharges into the Mississippi River, consumers of drinking water that flows through the Minneapolis intake could be exposed to an increased health risk. Although ground water in the contaminated areas currently is not used as a source for drinking water, the long-term risk of exposure through the potential use of private wells is a matter of concern.

Data derived from samples taken at the Minneapolis water intake on the river indicated that TCE contamination, some of which can be traced to the FMC and BNR lands, threatens to exceed the Maximum Contaminant Level (MCL) for TCE, as established by the Safe Drinking Water Act (SDWA).

Description of Feasibility Study

The purpose of the FS was to identify a remedial alternative that would minimize potential ingestion of contaminants directly from ground water or from the Mississippi River. The objective of the proposed response action was to keep the health risk at any existing receptor under 10^{-6} additional lifetime cancer deaths. The following remedial alternatives were formulated:

(1) No action;

(2) Long-term monitoring;

(3) Excavation and off-site disposal or on-site containment;

(4) Capping;

(5) Physical containment via barrier wall and pumping;

(6) Hydraulic containment of ground water;

(7) Ground-water treatment and/or disposal;

(8) Alternative water supply; and

(9) *In-situ* biological treatment.

Applicable or relevant and appropriate requirements (ARARs) identified for this operable unit included Federal and State drinking water standards, particularly Federal MCLs and levels set forth by the State of Minnesota. The discharge of treated water may be subject to requirements of the National Pollutant Discharge and Elimination System (NPDES) program and the Clean Water Act (CWA). Treatment involving air emissions may be subject to standards of the Clean Air Act (CAA) and relevant State requirements.

Since 1983, State officials have kept local public officials informed of events at and proposals for the FMC site. State officials discussed findings of the RI/FS in meetings held in December 1985 and October 1986. Additionally, in October 1986, the proposed Consent Order and plan for remedial action were presented to the public for comment. The proposed remedy (discussed below) has the broad support of the public and local government officials.

Description of Selected Remedy

EPA's recommended solution is a hybrid approach that combines hydraulic containment through extraction wells (Alternative 6), discharge of untreated ground water to a publicly-owned treatment works facility (Alternative 7), and long-term monitoring (Alternative 2). The enforcement of existing institutional controls will ensure that ground water is not used in areas between the site and the Mississippi River while the extraction system is operating.

Five wells will be used to pump water from the site's aquifers. Upon implementation, the extraction system will prevent migration of the contaminant plume from FMC and BNR lands. Extracted ground water will flow to a publicly-owned treatment facility. The effectiveness of this pump-and-treat system will be assessed through monitoring of receptors, ground-water levels, contaminant concentrations, and rates of discharge.

EPA believes that this alternative approach for the ground-water operable unit will provide a permanent solution to contamination at the FMC site. The operable unit deals strictly with the FMC and BNR lands and is expected to serve as a permanent remedy for contaminated ground water in these areas. EPA also believes that the remedy's expected attainment of State and Federal ARARs and its monitoring phase will ensure long-term effectiveness in protecting public health and the environment.

NEW BRIGHTON/ARDEN HILLS/ST. ANTHONY SITE
ST. ANTHONY OPERABLE UNIT
ST. ANTHONY, MINNESOTA

HRS Score: 59.16 **NPL Rank: 39**

Background

The New Brighton/Arden Hills/St. Anthony site is located immediately north of Minneapolis and St. Paul, Minnesota, in the adjacent communities of New Brighton, Arden Hills, and St. Anthony. The site consists of more than 18 square miles of ground water contaminated with volatile organic compounds (VOCs).

Approximately 75 to 80 percent of all Twin City communities that use ground water for drinking water receive it from the Prairie du Chien-Jordan aquifer system. In June 1981, the Minnesota Pollution Control Agency (MPCA) and the Minnesota Department of Health (MDH) detected volatile organic solvent contamination in the Prairie du Chien/Jordan aquifer system used for drinking water in New Brighton. The nearby City of St. Anthony subsequently detected VOC contamination in its three Prairie du Chien/Jordan aquifer wells.

In cooperation with EPA, the State conducted a preliminary Remedial Investigation (RI) of the site in 1983. Because the RI did not provide sufficient information on the contamination in the St. Anthony area, a further RI is being conducted. To provide sources of drinking water for affected residents in St. Anthony until the final remedial response is selected, EPA completed a Phased Feasibility Study (PFS). The resulting ROD for the St. Anthony operable unit was signed March 31, 1987. The final response action will be recommended in a subsequent ROD when the RI/FS is completed.

Federal and State enforcement activities identified more than ten potentially responsible parties (PRPs) that conducted some activity at either of the two major source areas: the Twin Cities Army Ammunition Plant (TCAAP) and a petroleum refinery. However, because none of the PRPs was willing to participate at that time, EPA and MPCA proceeded with funding and undertaking of remedial activities.

Description of Site Work

In 1983, the MPCA and EPA entered into a State lead cooperative agreement for conducting the RI to determine the extent and source of contamination. Trichloroethylene (TCE), the most prevalent VOC, was used as the indicator chemical. Preliminary results of the RI indicated two plumes of contaminated ground water in the site area.

The source of the plumes appeared to be several areas in the vicinity of the TCAAP. In wells in both New Brighton and St. Anthony, levels of TCE exceeded EPA proposed Maximum Contaminant Level (MCL) for the protection of human health from contaminants in drinking water. In response to the contamination, the City of New Brighton closed down its six Prairie du Chien-Jordan aquifer wells and tapped into a deeper aquifer.

The RI provided little information on the extent of contamination in the plumes in the St. Anthony area. To provide more information on the extent of the contamination, EPA and the State initiated a subsequent RI/FS. The MPCA is planning to complete the remaining tasks of the comprehensive RI in 1988-1989 in order to evaluate potential final remedial actions. The U.S. Army, the owner of TCAAP, has agreed in a Federal Facilities Agreement to do a comprehensive FS for the entire site area upon completion of the EPA and State RI. The U.S. Army, however, does not feel at this time that there is sufficient information to place responsibility for the St. Anthony area contamination on the TCAAP.

While the RI was being completed, several initial remedial measures (IRMs) were taken to provide drinking water for affected residents. The EPA lead IRM in 1983 involved installing granular activated carbon (GAC) filters in two wells in New Brighton. The State carried out an IRM to connect private well users in New Brighton to water mains. In 1984, the State conducted an IRM to temporarily connect St. Anthony's water supply to the City of Roseville.

Description of Feasibility Study

The primary objective of the St. Anthony operable unit PFS was to provide safe, potable water to consumers who were dependent upon St. Anthony's municipal wells. The PFS addressed separately the two primary municipal wells and the emergency/standby well. For the two municipal wells, three alternatives passed the initial screening:

(1) Connecting the St. Anthony wells to the Roseville/St. Paul system;

(2) Treating wells using air stripping process; and

(3) Treating wells using GAC adsorption.

Similar alternatives were developed for the emergency/standby well.

The alternatives were initially proposed before the passage of SARA and were subsequently reevaluated. Under CERCLA, the remedy must attain applicable or relevant and appropriate requirements (ARARs). Primary ARARs for this site were the MCLs set under the Safe Drinking Water Act (SDWA). The PFS assumed that certain MCLs, which only were proposed when the study was completed, would be final by June 1987.

Community response was considered a primary criterion in determining which of the three alternatives to recommend. The EPA presented results of the PFS at a public meeting and recommended construction of GAC water treatment facilities. Following public comment, the recommended alternative was amended to include the construction of a pipeline connecting the emergency/standby well to the treatment facility.

Description of Selected Remedy

The selected remedy (Alternative 3) consisted of treating two of the St. Anthony wells at a centralized location using GAC adsorption, and constructing a transmission line from the emergency well to the proposed central treatment facility. This remedy is the most cost-effective alternative and is expected to significantly and permanently reduce the volume of the contaminants of concern. Additionally, this alternative is expected to attain the ARARs at the site. To the extent practicable, the operable unit will contribute to the efficient performance of any long-term remedial actions.

NEW BRIGHTON/ARDEN HILLS/ST. ANTHONY SITE
TWIN CITIES ARMY AMMUNITION PLANT OPERABLE UNIT
NEW BRIGHTON, MINNESOTA

HRS Score: 59.16 **NPL Rank: 39**

Background

The New Brighton/Arden Hills/St. Anthony site is located in Ramsey County, Minnesota, north of Minneapolis and St. Paul. The site consists of more than 18 square miles of ground water contaminated with volatile organic compounds (VOCs). The Twin Cities Army Ammunition Plant (TCAAP) is located at the northern edge of the NPL site.

In June 1981, the Minnesota Pollution Control Agency (MPCA) and the Minnesota Department of Health (MDH) detected volatile organic solvent contamination in the Prairie du Chien/Jordan aquifer system. Approximately 75 to 80 percent of all Twin City communities that use ground water for drinking water receive it from the Prairie du Chien/Jordan aquifer system. The State conducted several initial remedial measures to provide drinking water to the affected communities and private well users.

In 1983, in cooperation with EPA, the State conducted a preliminary Remedial Investigation (RI) of the site. For the purpose of providing drinking water to different communities, the site was separated into several operable units. A ROD for the fourth operable unit was signed in June 1986 to provide New Brighton with an additional deep well. The ROD for the fifth operable unit was signed in March 1987 to provide carbon treatment for two wells in St. Anthony.

Federal and State enforcement activities identified the TCAAP as a major source of VOC contamination in both the Hillside Sand Aquifer and the deeper Prairie du Chien/Jordan Aquifer. Preventing migration of the VOC contamination plume was designated as the sixth operable unit of the site. In June 1987, the U.S. Army submitted its final proposal for construction of a gradient control system to intercept the contamination plume. The EPA concurred with this remedy in a ROD signed on September 25, 1987. Independent of this operable unit, the U.S. Army, EPA, and MPCA entered into a Federal Facilities Agreement.

The plume interception system is an interim remedial action. The MPCA, will complete an RI for the portion of the site outside of the Army plant boundaries that was originally started in 1983 with funding provided by a Cooperative Agreement between EPA and MPCA. The Army will conduct the on-site TCAAP RI and area-wide (on- and off-plant) Feasibility Study (FS). Upon completion of the RI/FS, EPA will evaluate potential final remedial actions in accordance with section 120 of CERCLA.

Description of Site Work

The ongoing RI conducted by EPA and MPCA and subsequent investigations indicated the TCAAP as a primary source of contamination. The U.S. Army has estimated that approximately 26 pounds per day of VOCs were migrating from TCAAP into the ground water of the Hillside Sand aquifer and the Prairie du

Chien/Jordan aquifer. Monitoring wells downgradient from the site showed VOC levels in excess of 40 ppm. The current MPCA study cannot determine if the plume of contamination extended beyond the New Brighton municipal well to the nearby city wells of St. Anthony. The pathway of greatest concern was through ingestion of drinking water.

Description of Feasibility Study

The U.S. Army document *Ground-water Remedial Action Alternative Analysis* considered three alternatives for preventing migration of contamination:

(1) Source removal and no action for the migrating contaminated water;

(2) Mechanical barriers -- source control and containment slurry walls, pumping wells, and capping; and

(3) Ground-water extraction system (referred to as the Boundary Ground-water Recovery System) -- hydraulic barriers with or without source removal and control.

The ROD does not provide details of the screening criteria used to evaluate these alternatives. Action-specific and contaminant-specific applicable or relevant and appropriate requirements (ARARs) pertinent to the selected remedy are discussed below.

EPA received numerous written and oral comments during the comment period. The primary concerns expressed at a public meeting were the delay in cleaning up the site, the possible health impacts, and the fact that the selected remedy is not a final solution. The public believed that the U.S. Army attempted to conceal the problem and avoid responsibility.

Description of Selected Remedy

EPA decided (and the U.S. Army concurred) upon the Boundary Ground-water Recovery System (Alternative 3) as the interim remedy. Ground water will be pumped from six previous Army-constructed wells, treated by air stripping, and reinjected into the aquifer via an infiltration basin. Water treated at the treatment facility is expected to meet Federal and State standards for drinking water, e.g., a cumulative risk-based criteria of 10^{-6} for carcinogens. The Army estimates that the system will stop 90 percent of the migrating VOCs. Based on information gathered during the first 90 days of pumping, EPA will determine if the existing well system is adequate for the protection of the aquifer.

The selected alternative is protective of human health and the environment, but, because it does not address the source of contamination, it is not a permanent remedy, it does not reduce mobility, volume, or toxicity of the hazardous constituents, and it does not use treatment to the maximum extent practicable. The interim remedy is, however, expected to attain ARARs. Contaminant-specific ARARs for operation of the air stripper include the Clean

Air Act (CAA) National Ambient Air Quality Standards (NAAQS) and National Emission Standards for Hazardous Air Pollutants (NESHAPS), and Minnesota Air Emission Rules 7001.1210, 7001.1212. ARARs pertinent to treatment and discharge of ground water include the Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs).

INDUSTRIAL EXCESS LANDFILL SITE
ALTERNATE WATER SUPPLY OPERABLE UNIT
UNIONTOWN, OHIO

HRS Score: 51.13 **NPL Rank: 164**

Background

The Industrial Excess Landfill (IEL) site is a closed sanitary landfill in the unincorporated town of Uniontown in northeastern Ohio. Although the site currently has a soil cover and vegetation, solid waste material is believed to lie under approximately 80 percent of the site. There are over 400 residential homes located within a 1/2 mile radius of the site.

From 1968 to 1980, the site was operated as a landfill for the disposal of municipal, commercial, industrial, and chemical wastes. In 1980, due to public concern and the fact that the landfill was reaching its capacity, the landfill was closed and covered. Complaints by residents prompted investigations of ground-water contamination because private wells were the source of drinking water for nearby residents.

In October 1984, the site was included on the NPL. The remedial investigation/feasibility study (RI/FS) was initiated in December 1984. EPA implemented interim emergency actions and conducted a Focused Feasibility Study (FFS) in August 1987 for the provision of safe drinking water. The ROD for the alternative water supply operable unit was signed September 30, 1987. EPA is continuing to develop a comprehensive RI/FS for a cleanup of the site. In April 1985, notice letters were sent to potentially responsible parties (PRPs), the owner/operator of IEL and several tire companies who were generators of the wastes. Negotiations did not produce a settlement and EPA took the lead in the cleanup. After the FFS was released for public comments, EPA issued special notice letters to PRPs concerning the implementation of the FFS.

Description of Site Work

The EPA lead RI indicated that some of the residential wells were contaminated with organic substances (vinyl chloride and chloroethane) and inorganic contaminants (barium, copper, cadmium, and nickel) that were attributable to the landfill. In addition, organic and inorganic substances were detected in the shallow wells near the border of the site. A risk assessment concluded that short-term and long-term consumption of ground water from contaminated residential wells may result in unacceptable health risks.

Description of Feasibility Study

Following emergency actions at the site, EPA initiated an FFS in August 1987. The major objective of the FFS was to provide a supply of safe drinking water to residents whose ground water was contaminated or has the potential for being contaminated. Four of eleven alternatives passed an initial screening based on effectiveness, implementability, and cost:

(1) No action;

(2) Construction of a new community well supply into the Pottsville Group aquifers upgradient from the site;

(3) Connection to the Village of Lakemore water system; and

(4) Connection to the City of North Canton water system.

Alternatives were evaluated based on their ability to protect public health and the environment and to meet applicable or relevant and appropriate requirements (ARARs). ARARs for drinking water were identified as the Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs), Maximum Contaminant Level Goals (MCLGs), and Ambient Water Quality Criteria (AWQC) adjusted for drinking water for vinyl chloride. For arsenic contamination, the ARARs were MCLs and the AWQC. For barium in the drinking water, the ARARs included MCLs, an Ohio EPA standard, and MCLGs. Because they involved an alternate water supply, none of the alternatives addressed reduction of the toxicity, mobility, or persistence of contaminants. The four alternatives provide long-term effectiveness by replacing the water supply.

Community involvement in the IEL site has been extensive. For example, 200 to 300 residents, the news media, and public officials attended a meeting in August 1987 following the issuance of the FFS. Many of the comments received during the public comment period were requests that EPA expand the area receiving the alternate water supply, and that sources other than that specified in the chosen remedy be considered.

Description of Recommended Remedy

The recommended remedy (Alternative 3) was the connection of approximately 100 homes to an alternate water supply, specifically, to the Village of Lakemore water system. The chosen remedial action is cost-effective, is a permanent remedy, and is expected to meet the ARARs identified; however, due to citizen concerns regarding water quality and capacity, EPA has deferred the decision on the alternate source of water. EPA issued a supplement to the ROD in December 1987, in which the water source was selected to be Country Club Village in Sumnut County.

LASKIN/POPLAR OIL SITE
SOURCE MATERIAL OPERABLE UNIT
ASHTABULA COUNTY, OHIO

HRS Score: 35.95 **NPL Rank: 492**

Background

The Laskin/Poplar Oil site is located west of the village of Jefferson in Ashtabula County, Ohio. The 9-acre site is bounded by Cemetery Creek and the Ashtabula Fairgrounds. The site was formerly used for a greenhouse operation beginning in the 1930s. Boilers were installed to heat the greenhouses in the 1950s, and tanks to hold waste oil for burning were built in the 1960s. When the greenhouse business declined, the owner of the site began collecting, reselling, and disposing of waste oils, much of which contained PCBs and other hazardous materials.

The State of Ohio initiated action against the site owner in 1979 for air and water pollution violations. In late 1980, EPA evaluated the need for remedial action at the site and in 1982 undertook an emergency action, which included removing 302,000 gallons of oil, treating 430,000 gallons of contaminated water, and solidifying 205,000 gallons of sludge. Potentially responsible parties (PRPs) removed another 250,000 gallons of oil wastewater in 1985 and 1986. EPA issued an Administrative Order of Consent to 12 PRPs between 1984 and 1986, requiring their participation in the remediation process.

EPA divided remedial activities at the site into two operable units and an overall site investigation. The first operable unit addressed the incineration of contaminated water and PCB-contaminated oils. The ROD for the second operable unit, which focused on source material that remained on site, was signed September 30, 1987. The overall site investigation still is being conducted and will address ground water, surface water, and soil contamination as well as the extent of dioxin contamination.

Description of Site Work

When the overall RI was initiated, the site contained 34 tanks, 4 pits, and treatment and retention ponds. Preliminary sampling indicated large amounts of seepage from tanks and unlined pits into surrounding soils. Investigations also identified a threat from contaminants leaching into ground and surface water, including Cemetery Creek, which runs into the Grand River, a source of drinking water for 25,000 residents.

Potentially responsible parties, under Consent Order, initiated the study for the second operable unit in 1985 to characterize the remaining on-site wastes. Results indicated that waste materials still present at the site after emergency removal actions posed a serious threat to human health and the environment through the threat of fire and exposure to PCBs. Major contaminants of concern at the site are PCBs, polynuclear aromatic hydrocarbons (PAHs), and volatile organic compounds (VOCs), all of which were present in high concentrations in waste oil and surrounding soils.

Description of Feasibility Study

The Phased Feasibility Study (PFS) for the second operable unit evaluated remedial alternatives for the removal of source materials, including sludges, waste oils, wastewaters, and contaminated soils (included in this operable unit because they were a source of potential contamination of ground and surface water). All attempts were made during the PFS to ensure that the alternatives developed for this operable unit were consistent with final remediation for the site. Remedial alternatives developed, in addition to a "no action" alternative, included:

(1) Solidification of all liquid wastes and disposal in licensed waste disposal facilities;

(2) On-site incineration of oils, sludges, and soils, with off-site treatment of wastewaters;

(3) Off-site incineration of oils, sludges, and soils and off-site treatment of wastewaters; and

(4) On-site incineration of oils, sludges, and soils that contained PCBs at concentrations greater than 25 parts per million (ppm) or halogenated organics at concentrations in excess of 500 ppm; landfilling of the remaining oils, sludges, and soils; and off-site treatment of wastewaters.

The PFS identified the Federal and State applicable or relevant and appropriate requirements (ARARs) that the remedial action must meet, consistent with the requirements of CERCLA. One technology considered for use on the site was on-site containment of the wastes. However, because the Resource Conservation and Recovery Act (RCRA) land disposal restrictions were considered ARARs, this option was not considered further. Other ARARs identified for this site included RCRA thermal destruction, incinerator, and off-site transportation regulations; Ohio Clean Air Act limits on incinerator emissions; and Ohio regulations for the off-site transportation of hazardous waste.

Public comment on the RI/FS was received during a public availability session, a public meeting, and through written comments. Residents and local officials supported the selected remedy discussed below.

Description of Selected Remedy

The remedy selected was on-site incineration of all oils, sludges, and contaminated soils and the off-site treatment of contaminated waters (Alternative 2). This alternative uses a proven technology (i.e., incineration), and, because contaminated materials are destroyed it satisfies CERCLA's preference for permanent solutions and use of treatment technologies. The remedy also does not involve the off-site transportation of hazardous materials (i.e., the oils, sludges, and contaminated soils) before treatment; when implemented, it will provide a high level of protection of human health and the environment. The remedy is also expected to meet all ARARs for this operable unit. The State of Ohio was consulted during the remedy selection process and concurred with the chosen alternative.

NORTHERN ENGRAVING CORPORATION SITE
SPARTA, WISCONSIN

HRS Score: 38.75 **NPL Rank: 414**

Background

The Northern Engraving Company (NEC) site is located in Sparta, Wisconsin, 23 miles east of LaCrosse, and is bordered on the south by the LaCrosse River. Areas of the river's floodplain lie within the site area, and a city well is 4,000 feet from the NEC site. The site includes a manufacturing facility that produces metal name plates and dials for the automobile industry. The manufacturing process involves metal finishing operations that include anodizing, chemical etching, and chromate conversion coating. During the 1970s, NEC discharged rinse water to the on-site sludge lagoon to allow the metal hydroxides to settle, and effluent from the lagoon ran along a drainage ditch to the LaCrosse River. By 1980, 2 to 4 feet of metal hydroxide sludge had accumulated in the lagoon. On several occasions, sludge was removed and landfilled on site. NEC also used a seepage pit to dispose of rinses and dye solutions.

EPA investigations of the NEC site resulted in its placement on the NPL in September 1983 and the identification of NEC as the potentially responsible party (PRP). Under a Consent Order with EPA, NEC initiated a remedial investigation/feasibility study (RI/FS) in September 1985. EPA signed the ROD September 28, 1987.

Description of Site Work

The RI conducted by NEC identified four separate areas as potential sources of soil, ground-water, and surface-water contamination: the sludge lagoon, seepage pit, sludge dump site, and lagoon drainage ditch. The sludge lagoon was contaminated primarily with metal hydroxides. The drainage ditch had elevated levels of fluoride, aluminum, chromium, and copper. On two occasions the sludge dump, now backfilled, received contaminated sludge from the lagoon which totals approximately 930 cubic yards. Metal hydroxides found in the lagoon are evident in the sludge dump. Ground-water monitoring within and downgradient from the seepage pit detected trace amounts of volatile organic compounds (VOCs) and elevated amounts of heavy metals. However, because no wells were threatened by contamination and the dilution caused by the LaCrosse River, ground-water contamination was considered to present no exposure risk. The LaCrosse River water exhibited no contaminants at concentrations exceeding any surface-water criteria except for zinc which was shown to meet the chronic toxicity water quality criteria. Thus, the RI concluded that the site presented few environmental or public health threats. The only considerable potential human health risks were from direct contact with soils in the drainage ditch and contaminated sludge in the sludge lagoon, and possible ingestion of contaminated ground water.

Description of Feasibility Study

The FS for the site, conducted by NEC under EPA's supervision, evaluated remedies for each discrete waste unit. Because the site appeared to present little endangerment to the environment or public health, the remedial action objectives emphasized the minimization of long-term contact with contaminated soil and the prevention of ingestion of the contaminated water. Potential remedial alternatives were screened against the CERCLA criteria of long-term effectiveness, implementability, and cost, and consideration was given to treatment technologies that permanently reduce toxicity, mobility, or volume of the waste.

The following remedies proposed for each area passed the initial screening:

(1) **Sludge Lagoon:**
- No action;
- Capping lagoon;
- Solidification of sludge and capping of lagoon;
- Excavation and off-site disposal of sludge and pumping and treating of ground water;
- Excavation and off-site disposal of sludge and soil and pumping and treating of ground water; and
- Excavation and off-site disposal of sludge and monitoring of ground water.

(2) **Drainage Ditch:**
- No action;
- Access restriction through installation of a fence;
- Excavation of contaminated drainage ditch soil and placement in sludge lagoon; and
- Excavation of contaminated drainage ditch soil and off-site disposal.

(3) **Sludge Dump:**
- No action;
- Capping of dump site;
- Excavation of sludge for off-site disposal; and
- Excavation of sludge and soil for off-site disposal; and
- Excavation of sludge and solidification in sludge lagoon.

(4) **Seepage Pit:**
- No action;
- Excavation of soil for off-site disposal;
- Access restrictions and ground-water monitoring; and
- Monitoring excavation of soil for off-site disposal, and pumping and treating of ground water.

The major applicable or relevant and appropriate requirements (ARARs) identified for the NEC site were Resource Conservation and Recovery Act (RCRA) closure and post-closure requirements, the Clean Water Act (CWA), Wisconsin

State closure and post-closure requirements, and State Ground-Water Protection Laws.

The NEC site generated little public interest since being identified as a Superfund site. The public made no comments on the RI/FS or Consent Order and no party expressed any interest in holding a public meeting.

Description of Selected Remedy

The selected remedy comprises three components: source control, migration management, and operation and maintenance. For source control, contaminated materials from the drainage ditch and sludge dump will be excavated and placed in the sludge lagoon for solidification. After solidification, the sludge lagoon will be provided with a RCRA cover and monitored for proper closure. Deed restrictions and long-term monitoring will be implemented for the seepage pit. Migration management consists of monitoring contaminated water through the application of alternative concentration limits (ACLs) downgradient from the sludge lagoon and the seepage pit. For operation and maintenance, the cover over the sludge lagoon and the seepage pit will routinely be inspected and monitored. Semi-annual ground-water sampling and analyses at compliance monitoring wells will also be conducted.

The statutory emphasis on treatment and long-term effectiveness is fulfilled through the use of solidification. The long-term effectiveness of RCRA caps placed over the sludge dump and seepage pit can be ensured only as long as monitoring continues. The remedy reduces the mobility of the contaminants, but does not reduce their volume or toxicity. The selected treatment is expected to attain ARARs.

SCHMALZ DUMP SITE
SECOND OPERABLE UNIT
HARRISON, WISCONSIN

HRS Score: 48.92 **NPL Rank: 190**

Background

The Schmalz Dump site is located on the north shore of Lake Winnebago in Harrison, Wisconsin, 90 miles north of Milwaukee. The site consists of 7 acres of wetlands that since 1968 were used as a waste dump for solid waste, car bodies, pulp chips, and other materials. Between 1972 and 1973, Gerald Schmalz, the former owner of the site, accepted fly ash and bottom ash from Menasha Utility. In 1978 and 1979, Schmalz accepted the demolition debris of a building owned by the Allis-Chalmers Corporation. EPA suspects that these wastes are sources of present contamination at the site.

The Wisconsin Department of Natural Resources (WDNR) and the U.S. Army Corps of Engineers conducted on-site soil sampling in early 1979 and found high concentrations of PCBs in the area of the Allis-Chalmers debris, as well as lead and chromium throughout the site. In 1979, the State sued Mr. Schmalz, the waste hauler, and Allis-Chalmers for illegal PCB-disposal, but lost the case because of lack of evidence. Mr. Schmalz sold the dump to his son in 1983.

In September 1984, the site was placed on the NPL. The EPA lead remedial investigation/feasibility study (RI/FS) was initiated during April 1985. Because of the immediate health threat presented by the PCB-contaminated debris, EPA and WDNR decided to designate an operable unit specifically to address this contamination. The ROD for this operable unit was signed in August 1985 and called for removal of PCB-contaminated debris and sediments. The RI/FS for remediation of the rest of the site has progressed concurrently with the design of the PCB contamination operable unit remedy. The RI for the entire site was completed in June 1987. The FS report was finalized in August 1987 and the ROD signed September 30, 1987.

Eight potentially responsible parties (PRPs) were identified for the site. Notice letters were sent and a negotiating meeting held to discuss the RI/FS, but none of the parties committed to perform the RI/FS.

Description of Site Work

The objective of the RI for the entire site was to characterize the areas of the site that were not addressed by the PCB-contamination operable unit. Results of the study indicated that lead and chromium were the contaminants of concern at the site and that direct contact with surface and subsurface soil were the exposure pathways of greatest risk. PCB contamination is confined to the area in which demolition debris was disposed; EPA addressed this threat by removing the debris during the PCB-contamination operable unit remedial action.

Although traces of chromium were found in ground water beneath the site, EPA determined that this contamination did not pose a health threat because levels were below Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs). Test results indicated that leaching of soils was not likely to increase chromium and lead concentrations in the ground water to levels greater than MCLs. However, the remote possibility exists that this pathway could become a concern at a later time.

Description of Feasibility Study

The objectives of the FS for the rest of the site were to protect the public from direct contact with contaminated soils, and to monitor for degradation of ground-water quality from those soils. The FS developed the following six alternatives to meet these objectives, all of which met initial screening criteria and were retained for detailed analysis:

(1) Ground-water extraction; treatment of ground water with coagulation/flocculation, filtration and ion exchange to reduce contamination to background levels; and discharge of the treated ground water to a nearby stream;

(2) Construction of a slurry wall; placement of a soil, gravel, and clay cap; and ground-water monitoring;

(3) Construction of a Resource Conservation and Recovery Act (RCRA) Subtitle C compliant cap, and ground-water monitoring;

(4) Construction of a low-permeability soil cover, and ground-water monitoring;

(5) Excavation of contaminated soil, solidification/stabilization of the soil, and replacement with treated soil; and

(6) No action.

The following Federal applicable or relevant and appropriate requirements (ARARs) were identified: SDWA MCLs; Clean Water Act (CWA) Ambient Water Quality Standards; Water Quality Act of 1987 Great Lakes Protection requirements; Executive Orders for Protection of Wetlands and Floodplain Management; and RCRA clean closure and landfill closure requirements. State ARARs included ground-water protection, shoreland management, and closure requirements.

During the public comment period, a local water-quality planning agency and one private citizen expressed support for the RCRA compliant cap alternative. The community does not perceive the site as an immediate danger, although some residents are concerned about the potential for contamination of the Appleton water supply. The State expressed support for alternatives that involve capping of the site, but was concerned that the cap would not adequately be protected from damage. The State will attempt to obtain a voluntary agreement from the landowner not to damage the cap once it is installed. The State is aware that EPA has the legal authority to order further corrective action should the owner attempt to damage the cap.

Description of Selected Remedy

The remedy selected for the Schmalz Dump site (Alternative 4) included the following actions: installation of a low-permeability soil cap over the contaminated soil; implementation of a ground-water monitoring program and a voluntary well abandonment program for residents; and a recommendation that adjacent property be analyzed for contamination.

The selected remedy is the most cost-effective alternative, is expected to attain ARARs, and adequately protects human health and the environment by eliminating the threat of direct contact with contaminated soils. The remedy does not reduce the toxicity of lead and chromium in soils or in the ground water, and provides minimal protection for ground water. It will reduce the mobility of contaminants in soil, however, and provide long-term protection of soil.

BAYOU BONFOUCA SITE
SOIL CONTAMINATION OPERABLE UNIT
SLIDELL, LOUISIANA

HRS Score: 29.78 **NPL Rank: 731**

Background

The Bayou Bonfouca site is located about 7 miles north of Lake Pontchartrain in Slidell, Louisiana, and has an area of about 55 acres. The site is an abandoned and dismantled creosote works that is within the designated 100-year flood plain of the bayou. Land use to the east of the site is primarily commercial, and to the southwest across the bayou is a residential subdivision.

From 1892 to 1970, the facility was operated under the ownership of various creosote companies, and is currently owned by the Braselman Corporation. During its operating history, the facility has had numerous releases of creosote. The primary contaminants are polynuclear aromatic hydrocarbons (PAH) that have been found in the soils, surface-water deposits, ground water, and bayou and channel sediments.

Numerous studies have been conducted to identify and determine the extent of contamination at the site. An initial investigation in 1976 by the U.S. Coast Guard was followed by a 1978 study conducted by EPA, the Coast Guard, and the National Oceanic and Atmospheric Administration. Two potentially responsible parties (PRPs) were identified: American Creosote Works, the last wood treating company to operate the site, and Braselman Corporation, the present owner. In 1981, the State of Louisiana rejected a cleanup proposal proposed by Braselman Corporation, and the site was included on the NPL in December 1982.

In 1983, EPA initiated a phased remedial investigation/feasibility study (RI/FS) for Bayou Bonfouca. The first phase identified and estimated the surface contaminants which resulted in a focused feasibility study (FFS). Based on the FFS, a record of decision (ROD) was signed in August 1985 for the removal and offsite disposal of contaminated materials. Due to further studies in the second phase and changes in CERCLA as amended by SARA, off-site disposal was never implemented. A new ROD for the Bayou Bonfouca site was issued in March 1987 as detailed in the following paragraphs. The final remedial investigation report and feasibility reports were issued in April and June 1986, respectively.

Description of Site Work

The remedial investigations have identified that the contaminated areas include a major portion of the south half of the site, Bayou and channel sediments, and the surficial and shallow artesian aquifers. These studies indicate that Bayou and channel contaminated sediments are estimated at approximately 47,000 cubic yards.

Description of Feasibility Study

The June 1986 FS identified remedial alternatives necessary to reduce or eliminate the potential for ingestion of carcinogens in ground water, surface soils, and shellfish; to control the migration of PAH contamination in the aquifer; and to reduce or eliminate the direct contact threat posed by the sediments and surficial waste.

After a final screening of alternatives, a total of nine treatment alternatives for source control were considered:

(1) No action;

(2) Permanent diversion of the bayou with in-place stabilization of bayou sediments with backfill and cap, on-site landfill of creosote waste piles, and on-site cap of soil;

(3) Bayou partition and on-site landfill of sediments, on-site landfill of creosote waste piles, and on-site soil cap;

(4) Alternative 3 with off-site landfill of sediments and waste piles;

(5) Bayou partition and on-site incineration of sediment, waste piles, and soil;

(6) Alternative 5 using a soil cap instead of incinerating contaminated soil;

(7) Bayou partition and on-site biological treatment of sediment, waste piles, and soil;

(8) Bayou partition and off-site landfarming of sediment, waste piles, and soil; and

(9) Bayou partition and off-site incineration of sediment, waste piles, and soil.

The eight remedial action alternatives included identical measures for remediating ground-water contamination through use of slurry walls around the site.

In July 1986, a public meeting was held in which citizens requested a 3-month extension of the public comment period until October 31, 1986. During this time SARA was signed and the proposed remedy for the site did not comply with the provisions of the Act. Under CERCLA as amended, consideration of alternatives must demonstrate a preference for permanent solutions, and all remedial action must attain applicable or relevant and appropriate requirements (ARARs). Several of the remedies considered in the June 1986 FS were permanent solutions. The relevant ARARs identified and considered included Executive

Orders 11988 and 11990 for Floodplain Management and Protection of Wetlands, the Clean Water Act (CWA), and the Resource Conservation and Recovery Act (RCRA).

Description of Selected Remedy

The alternative recommended for the Bayou Bonfouca site (Alternative 6) includes on-site incineration of the creosote waste deposits and contaminated sediments in a mobile incinerator. The incinerator ash and contaminated soils will be covered with a RCRA cap. Ground water will be remediated through a pump-treat reinjection process.

This alternative is considered protective and cost-effective, is expected to attain ARARs, and uses permanent solutions and treatment technologies to the maximum extent practicable. The Louisiana Department of Environmental Quality concurred with this remedy.

CLEVE REBER SITE
ASCENSION PARISH, LOUISIANA

HRS Score: 48.80 **NPL Rank: 196**

Background

The Cleve Reber site is located in Ascension Parish, Louisiana, between New Orleans and Baton Rouge. The 25-acre site is bounded by swamps and semi-developed agricultural and residential areas. Originally used as a borrow pit, the site later became a disposal area for municipal and industrial waste between 1970 and 1974. Environmental Controls Company (ECC), with Cleve Reber as president, leased the property and operated a landfill before abandoning the site in 1974.

After numerous site inspections and sampling efforts, the State of Louisiana declared the area an abandoned hazardous waste site in October 1979. Information provided by potentially responsible parties (PRPs) suggested that 6,400 drums of waste were buried on site. In response to public concern, EPA conducted an emergency removal of 1,100 surface barrels and waste piles in 1983.

An EPA lead remedial investigation (RI) completed in May 1985 indicated that the major concern is the Norco Aquifer, a surface-flowing artesian aquifer that supplies fresh water to industrial and private consumers. Ground-water samples collected in early June 1985 provided additional data for evaluating remedial response. Due to lack of data, a supplemental remedial investigation/feasibility study (RI/FS) was completed in September 1986, and the ROD was signed March 31, 1987.

EPA has since issued notice letters to ECC, former owners of the property and known generators of the hazardous waste. Several PRPs that identified themselves as waste generators participated in the emergency removal and expressed interest in participating in remedial actions.

Description of Site Work

Results of the initial RI indicated that industrial waste, consisting partly of hazardous organic compounds, has migrated and mixed with the municipal waste. Significant soil contamination has been detected on site, and studies of ground water in the shallow sand layer beneath the site found elevated levels of hexachlorobenzene (HCB), hexachloroethane (HCE), and hexachlorobutadiene (HCBD). Because the contamination was detected in the shallow sand layer, an additional RI/FS was undertaken to investigate ground-water contamination.

The primary hazards to human health were associated with ingestion of or direct contact with surface soils, on-site surface water, on-site leachate, and ground water. The RI found no contamination in the deep sand layer or in the Norco Aquifer, and contamination appeared to be confined to the site.

Description of Feasibility Study

The initial FS was completed in May 1985, and the supplemental RI/FS was completed in September 1986. Although the original and supplemental RI/FSs predated SARA, efforts were made to conform the supplemental study to the anticipated statutory requirements for selecting permanent solutions and treatment technologies to the maximum extent practicable.

Based on the criteria of effectiveness, implementability, cost, and ability to meet applicable or relevant and appropriate requirements (ARARs), the following remedial alternatives were considered:

(1) No action;

(2) Complete removal of all contaminated material with disposal in an off-site landfill;

(3) Closure of the site with containment of all contamination;

(4) Alternative 3 with on-site incineration or disposition of all bulk sludges and materials in drums;

(5) Alternative 3 with off-site incineration;

(6) Alternative 2 with off-site incineration; and

(7) Alternative 2 with on-site incineration.

ARARs identified in the supplemental FS included the Clean Water Act (CWA), the Resource Conservation and Recovery Act (RCRA), Executive Orders for Floodplain Management and Protection of Wetlands, and State laws. At the time the ROD was signed, the State had not identified any ARARs other than those identified by EPA.

EPA issued a press release on May 31, 1985, that described the site and discussed EPA's proposed remedy. At that time, the proposed remedy was a cap-in-place approach. Sampling results subsequently released prompted EPA to postpone a decision on the remedy and commence a supplemental RI. After identifying its preferred alternative (discussed below), EPA conducted another public meeting in February 1987. Most people attending favored the selected remedy.

Description of Selected Remedy

EPA recommended Alternative 4 as the approach for remediation of the Cleve Reber site. Alternative 4 involves the on-site incineration of drummed wastes and bulk sludges, the removal and backfilling of all ponds, and the use of a RCRA cap over remaining contamination. The cap will cover only the area of the site used for disposal of industrial or hazardous waste. The alternative will involve removal of the source of ground-water contamination, thereby reducing the future volume and mobility of the contaminants.

Residual contamination after the source removal will be attenuated by the underlying organic clays. The site will be monitored for 30 years to guard against the migration of contaminants. The alternative chosen is adequately protective, cost-effective, is expected to comply with ARARs, and uses permanent solutions and treatment technologies to the maximum extent practicable.

Description of Remedial Design

In September 1987, EPA and the contractor began the remedial design. In February 1988, field work to gather additional information for the design began. Trenching was performed to identify specific locations of buried drums and bulk sludges. Leachate, pond water, and waste were sampled for additional testing. Design specifications and contract documents are scheduled to be completed by the spring of 1989.

COMPASS INDUSTRIES LANDFILL SITE
WEST TULSA, OKLAHOMA

HRS Score: 36.57 **NPL Rank: 483**

Background

The Compass Industries Landfill site is located in West Tulsa, Oklahoma near the communities of Berryhill and Sand Springs. The site includes a 32-acre landfill area and is situated on a bluff approximately 200 feet above the Arkansas River. Surface water from precipitation runoff, springs, and seeps flows into the River from the bluff through a network of small streams. The site is underlain by two aquifers, neither of which is known to be used for drinking water.

The site was initially used as a limestone quarry from the 1930s through the 1950s. From 1972 to 1976, the site was permitted by the Oklahoma State Department of Health (OSDH) as a municipal and industrial landfill, although there is evidence that dumping occurred at the site as early as 1964. During the 1970s, several fires were reported at the landfill. Following complaints from residents about air emissions from the fires, the State and EPA investigated the site. The site was listed on the NPL in September 1984.

EPA provided funding for a State lead Remedial Investigation (RI) in 1984 to determine the extent of ground- and surface-water contamination. The remedial investigation/feasibility study (RI/FS) was completed in mid-1987 and the ROD was signed September 29, 1987. Investigations have identified approximately 20 potentially responsible parties (PRPs), but there has been no documented involvement by PRPs in the remediation process.

Description of Site Work

The State lead RI identified surface runoff to the Arkansas River as the most significant pathway of exposure. The RI identified 12 inorganic and 33 organic pollutants in the two aquifers beneath the site and in surrounding soils. Although the upper aquifer on the site was highly contaminated, the hydrogeology and topography of the site appeared to have minimized the migration of the contaminated ground water.

Description of Feasibility Study

The State lead FS developed an initial set of remedial approaches for limiting surface-water migration. Six alternatives were chosen for a full evaluation against the criteria specified by CERCLA:

(1) No action;

(2) Capping and on-site ground-water treatment;

(3) Capping and off-site ground-water treatment;

(4) Complete on-site thermal destruction of landfilled material;

(5) Partial on-site thermal destruction of landfilled material and capping of soils; and

(6) Partial off-site thermal destruction of landfilled material and capping of soils.

The FS also identified the applicable or relevant and appropriate requirements (ARARs) that the remedial action must meet. Federal ARARs identified for the site included Resource Conservation and Recovery Act (RCRA) capping requirements, National Pollution Discharge and Elimination System (NPDES) requirements, the Clean Water Act (CWA), the Fish and Wildlife Coordination Act (FWCA), and the Endangered Species Act (ESA). State ARARs identified included the Oklahoma Clean Air Act and Oklahoma Water Quality Standards.

There was substantial public involvement during the RI/FS process. EPA held a public meeting on August 18, 1987, to explain the remedy that was proposed (discussed below) and to answer questions from the approximately 65 people in attendance. EPA also met with officials from Tulsa and the City of Sand Springs in order to explain the proposed remedy.

Description of Selected Remedy

The remedy proposed during the public comment period and subsequently selected was Alternative 2, a cap constructed to meet the specifications of RCRA closure requirements and treatment of the upper, perched aquifer, if deemed necessary following placement of the cap. Specifically, the remedy consisted of site grading, placement of a cap over contaminated soils, diversion of surface water from the site, monitoring of air emissions in case of further fires, and installation of security fences and warning signs to restrict access to the site. EPA decided to defer treatment of the upper, perched aquifer until after placement of the RCRA cap and evaluation of the cap's effectiveness in restricting or eliminating the surface-water discharges along the bluff.

This remedy is expected to be protective of human health and the environment and uses permanent solutions and treatment technologies to the maximum extent practicable. The remedy is also expected to attain all ARARs. The State of Oklahoma was consulted during the FS, and concurred with the remedy selected.

SAND SPRINGS PETROCHEMICAL COMPLEX SITE
SOURCE CONTROL OPERABLE UNIT
SAND SPRINGS, OKLAHOMA

HRS Score: 28.86 **NPL Rank: 761**

Background

The Sand Springs site is located in an industrial complex on the northern bank of the Arkansas River in Sand Springs, Oklahoma, 5 miles west of Tulsa. The site is the former location of the Sinclair oil refinery, which operated from the turn of the century until 1949. The site encompasses approximately 235 acres and most of the property was conveyed to Sand Springs Home in 1953 to be developed into an industrial area. In 1969, the remaining 38-acre tract of land at the site was put under control of the Atlantic Richfield Company (ARCO) in a merger with Sinclair.

Part of the site developed as an industrial area and was used by a solvent recycling facility in the late 1960s and early 1970s. During this period, hazardous substances were stored or disposed of in drums, tanks, unlined pits, and lagoons, or buried on site. Sulfuric acid sludge pits from the former refining operation are contaminated with heavy metals and organics. Construction activities exposing part of one pit resulted in a release of fumes that necessitated evacuation of a nearby factory, during which several people required medical attention. Other waste pits have contaminated ground water with volatile and non-volatile organics and chlorinated solvents. EPA investigations in 1980 and 1982 revealed that lagoons and a surface impoundment were also contaminated. A total of approximately 130,000 cubic yards of waste are present at the site.

EPA proposed the site for the NPL in September 1983. In June 1984, the Oklahoma State Department of Health (OSDH) agreed to conduct the remedial investigation/feasibility study (RI/FS) using funds EPA provided. In an attempt to address the most apparent contamination quickly, EPA established a source control operable unit to focus on waste in the pits, ponds, and lagoons. OSDH completed the source control operable unit RI/FS in April 1987, and the ROD was signed September 29, 1987. The remainder of the site, including ground-water contamination, was addressed in a final operable unit FS that was completed in April 1988. A public meeting was held March 24, 1988. The proposed remedy is no action (monitoring following the source control remedial action). The ROD is expected to be signed in June 1988.

EPA has identified approximately 300 potentially responsible parties (PRPs) for the site, two of which have taken actions at the site under administrative orders.

Description of Site Work

During its source control RI, the OSDH sampled 11 waste disposal locations on the Sand Springs site. Results indicated that all surface locations were contaminated with inorganic and organic compounds. The priority pollutants identified included lead, zinc, chromium, chrysene, phthalate, toluene, trans 1,2-dichloroethene, and tetrachloroethane. The source control RI also identified three major risks to human health and the environment from the site: direct contact with wastes; air emissions from the site; and surface-water contamination due to runoff from the site during heavy rains.

Description of Feasibility Study

In order to mitigate the on-site soil, surface- water, and air contamination, the OSDH developed five remedial alternatives, in addition to the "no action" alternative:

(1) Excavation and on-site thermal destruction of contaminated sludges and on-site disposal of residual ash;

(2) Solidification of contaminated sludges and disposal in an on-site landfill;

(3) Excavation and on-site neutralization, solvent-extraction, and treatment of hazardous sludges, and disposal of oil, water, and solid byproducts;

(4) Excavation and off-site thermal destruction of contaminated sludges; and

(5) Excavation and off-site solvent-extraction treatment of contaminated sludges.

Alternatives, which utilized any on-site disposal, also included construction of a RCRA cap over the landfill area. Each alternative also included removal and treatment of contaminated liquids.

The FS identified the following applicable or relevant and appropriate requirements (ARARs) for the site: the Resource Conservation and Recovery Act (RCRA); the Clean Air Act (CAA) National Ambient Air Quality Standards (NAAQS); National Pollutant Discharge Elimination System (NPDES) requirements; the Clean Water Act (CWA); Executive Order 11988 for Floodplains; the Fish and Wildlife Coordination Act; and State solid waste, hazardous waste, clean air, and water quality regulations.

The local community expressed concern about the construction of an incinerator on site, particularly about potential air pollution from the incinerator, potential decline in property values from its presence, and whether the incinerator would be removed after cleanup. At least 180 people attended the public meeting held to discuss the source control RI/FS results, during which EPA agreed to extend the public comment period.

Description of Selected Remedy

After detailed analysis of the alternatives, EPA proposed the on-site thermal destruction as the source control alternative best satisfying statutory criteria, although this remedy was costly and neither the State or the local community preferred it.

During the public comment period, ARCO, as a PRP, made a proposal for a privately financed remedy for the site that did not include construction of an on-site incinerator. EPA evaluated ARCO's proposal and decided to allow ARCO to prove its effectiveness during the remedial design phase of the source control operable unit. However, if the design of the ARCO remedy fails to satisfy EPA criteria, the ROD stated that incineration will be the remedy. The ARCO proposal includes the following actions:

- Excavation and off-site thermal destruction of sludges in the waste oil and solvent lagoon areas; and
- Solidification/stabilization of all remaining sludges in a manner meeting EPA criteria, and containment of the resulting matrix in a cell or cells to be constructed on site in compliance with RCRA requirements.

Although ARCO's proposal would reduce greatly the mobility of wastes, the toxicity of wastes would not be reduced and the volume of wastes would actually increase. EPA is also concerned about the lack of demonstrated permanence of the solidification alternative. Unlike thermal destruction, which would eliminate organic contaminants permanently, the capability of solidification or stabilization techniques to contain high organic wastes securely and permanently has not been demonstrated in the pilot studies conducted on site. However, ARCO has assured EPA that if the remedy fails, the company will take further corrective action. ARCO has signed a consent decree to conduct the remedial design and remedial action. Remedial design is anticipated to begin in the summer of 1988.

This remedy is expected to be technically feasible and to meet ARARs. The ARCO proposal initially would cost less than thermal destruction, and the State, local agencies, and residents support it.

CRYSTAL CITY AIRPORT SITE
CRYSTAL CITY, TEXAS

HRS Score: 32.26 **NPL Rank: 639**

Background

The Crystal City Airport site is located in Crystal City, Zavala County, Texas, approximately 100 miles southwest of San Antonio. Several private companies conducted aerial pesticide application businesses at the airport until 1982. In response to concerns that agricultural chemicals left by defunct aerial operators presented a threat to local residents, the Texas Department of Water Resources conducted a preliminary investigation of the site. The results of this investigation, and of follow-up investigations, indicated that surface soil was highly contaminated with pesticides.

In October 1983, EPA initiated an immediate removal action to remove 40 yards of waste and 50 to 70 drums of the most highly contaminated materials. In a second removal action, initiated in May 1984, EPA transported 19 drums off site for disposal, constructed a fence with a locked entrance gate, and posted warning signs. A draft remedial investigation/feasibility study (RI/FS) for the site was completed in April 1987, and the ROD was signed September 29, 1987.

Five potentially responsible parties (PRPs), including the City of Crystal City, have been identified. Four PRPs are no longer in business and the City appears unable to finance the cleanup.

Description of Site Work

Following the immediate removal actions, EPA and the State of Texas entered into a cooperative agreement in September 1985 to perform an RI/FS at the site. A draft RI report submitted in April 1987 identified 2 primary areas in which surficial soil contamination was 1 to 3 feet deep. A combined cleanup level of 100 mg/kg was proposed for the contaminants of greatest concern: toxaphene, DDT, and arsenic. The RI determined that remedial action would be required to reduce the potential for public health exposure through direct contact with and ingestion of contaminated soils and inhalation of contaminated dust particles. The RI indicated that treatment for surface-water, ground-water, and ambient-air contamination would not be needed.

Description of Feasibility Study

In order to meet the objectives of reducing soil contamination levels to 100 mg/kg total pesticide (toxaphene, DDT, arsenic), maintaining background air quality levels, and minimizing surface-water degradation, a number of potentially applicable remedial technologies were studied. An initial screening based on the criteria of long- and short-term environmental and health effects, implementability, and cost was performed, after which eight alternatives remained:

(1) No action;

(2) In-place containment of soils with an 8-acre, 9-inch asphalt cap;

(3) Consolidation of wastes and capping with a multi-layered cap;

(4) Containment of soil (without treatment) in an off-site landfill;

(5) Solidification of contaminated soil and placement in an off-site landfill;

(6) On-site incineration and soil washing of contaminated soil;

(7) Placement of soil in an off-site landfill; and

(8) Decontamination of soil (soil flushing) through utilization of a critical pressure fluid extraction unit.

The following applicable or relevant and appropriate requirements (ARARs) for the site were identified: Clean Water Act (CWA) water quality standards, Clean Air Act (CAA) National Ambient Air Quality Standards (NAAQS), the Texas Solid Waste Disposal Act, and the Texas Clean Air Act.

Some community members attending the public meetings for the site expressed support for incineration of the contaminants. Some commenters alleged that the proposed remedy (Alternative 3) was "substandard" and did not meet CERCLA statutory preferences for permanent remedies and treatment alternatives that significantly reduce the mobility, toxicity, or volume of the contaminants. EPA indicated, however, that such soil treatment alternatives would not significantly reduce the mobility of the contaminants, because of the characteristics of the contaminants and the impermeable nature of the soils. Although toxicity of organic contaminants could be reduced through an integrated incineration system, the technology necessary to remove the arsenic compound from the soil does not exist.

Description of Selected Remedy

The alternative recommended for the site includes on-site consolidation and RCRA-approved capping of soil whose contamination exceeds a combined total of 100 mg/kg toxaphene, DDT, and arsenic (Alternative 3). The proposed remedy will minimize the forces that drive the transport of waste from the site and will remove the direct contact threat. Although the remedy selected does not involve permanent treatment, it is expected to attain ARARs.

HIGHLANDS ACID PIT SITE
GROUND-WATER REMEDIATION OPERABLE UNIT
HIGHLANDS, TEXAS

HRS Score: 37.77 **NPL Rank: 450**

Background

The Highlands Acid Pit site is located on a sparsely populated area 1.4 miles west of Highlands, Texas. Dense vegetation covers the site, except for a bare area at the site center that is believed to be the primary dumping area. The site was used for the disposal of industrial waste sludge, probably sulfuric acid from a refinery process, during the early 1950s. Organic and inorganic constituents have been found in the site's shallow aquifer.

In 1984, EPA signed a ROD addressing the source of contamination at the site. The remedy called for excavation and disposal of contaminated soil and the installation of a ground-water monitoring system. The ground-water remediation phase is a separate operable unit, for which an independent ROD was signed June 26, 1987. The ground-water operable unit is based on the remedial investigation/feasibility study (RI/FS) conducted in preparation for the 1984 ROD, and on subsequent studies of ground-water contamination.

Only one potentially responsible party (PRP), the landowner, has been identified. This PRP lacks the resources to underwrite ground-water remediation, and attempts to locate generators of the waste have failed. EPA therefore proposes to use Fund resources for the ground-water remediation operable unit.

Description of Site Work

Prior to the 1984 ROD, EPA conducted an RI/FS to assess wastes in the hydrogeologic system. This RI included information relevant to the ground-water operable unit. In November 1985, EPA conducted a further ground-water study to evaluate the potential for shallow contaminants to migrate after the source of contamination was removed.

Sampling results revealed high concentrations of volatile organic compounds (VOCs) and metals in the shallow aquifer. Contaminants of major concern included benzene, pyridine, cadmium, chromium, and lead. No contaminants of concern were detected in the middle aquifer. Studies of the ground-water flow indicated that the contaminants will attenuate to nondetectable levels in about 350 years. Inorganics at the site will settle between the top and middle aquifers; organics, if they reach the middle aquifer, could be detected by ground-water monitoring before levels of concern are reached.

Description of Feasibility Study

A feasibility study (FS) for the ground-water operable unit was completed in 1986 to eliminate or reduce the risk of future exposure to the shallow aquifer contamination. EPA developed five remedial alternatives to be evaluated during the FS, and subsequently performed ground-water studies to provide the necessary data for the evaluation. The following alternatives were considered:

(1) Isolation of the upper aquifer;

(2) Recovery and off-site disposal;

(3) Recovery, biological treatment, and discharge/disposal;

(4) Recovery, carbon absorption, and discharge/disposal; and

(5) No action, with ground- and surface-water monitoring.

As required by CERCLA, EPA considered applicable or relevant and appropriate requirements (ARARs) in evaluating the alternatives. Water Quality Criteria (WQC) were judged to be ARARs for contaminants in the upper aquifer because of the hydrogeologic connection to surface waters. Maximum Contaminant Level concentrations (MCLs) were determined to be ARARs for the deeper ground waters.

Description of Selected Remedy

EPA recommended selection of the "no action" alternative (Alternative 5), which included monitoring of the surface environment and ground water. EPA determined that this alternative was consistent with legal requirements and was protective of public health and the environment. This judgment rested on the finding that although organics and inorganics are present in the shallow aquifer, they have not affected deeper ground water. Once the source removal is complete, the migration of contaminants to the shallow aquifer will be reduced. The natural flow of water will attenuate present contaminants, leaving the middle aquifer unaffected.

Although CERCLA promotes the selection of permanent remedies that reduce the toxicity, mobility, or volume of contaminants, the long- and short-term effects of the preferred remedy compare favorably with the other alternatives. Because the ground-water recovery alternative would have exposed area residents to the contaminants over a 7- to 9-year period, it was eliminated as an option. The 1986 Land Disposal Restrictions prevented the selection of the alternative to recover and dispose of ground water.

EPA and the Texas Water Commission participated in a public meeting held on May 12, 1987, to discuss the details of the remedy. Those attending the meeting generally expressed satisfaction with the remedy.

PETRO-CHEMICAL SYSTEMS INC., SITE
FRONTIER PARK ROAD OPERABLE UNIT
LIBERTY, TEXAS

HRS Score: 29.94 **NPL Rank: 728**

Background

The Petro-Chemical site is a 296-acre tract of land located in a sparsely populated area south of Liberty in southeastern Texas, approximately 40 miles northeast of Houston. In the northwest corner of the site, unspecified waste oils were stored in several pits. In June 1970, all disposal operations were discontinued. Waste oils also were spread on Frontier Park Road as a method of dust control. The road lies within the site boundary and provides the primary access to persons living at the site. The site has been inhabited by as many as 11 families since 1974, although only two families remain as of August 1986.

Preliminary sampling performed by the Texas Water Commission (TWC) in 1982 and 1984 revealed elevated concentrations of polyaromatic hydrocarbons (PAHs) in the disposal pits. The State lead remedial investigation/feasibility study (RI/FS) for the site was completed in November 1986, and the ROD was signed March 27, 1987.

Four potentially responsible parties (PRPs) have been identified for the site, including three landowners and one transporter of the waste. None of the PRPs has complied with an administrative order to install a fence around the main disposal area, nor have they indicated any responsibility or willingness to fund any portion of the cleanup.

Description of Site Work

The State initiated an RI/FS for the site in March 1985, and RI activities were conducted in February and June of 1986. The sampling efforts identified several areas of soil that were moderately to highly contaminated with PAHs, particularly benzene and naphthalene. Because Frontier Park Road has significant quantities of contaminated soils and is the primary access road for residents, the risk of exposure through inhalation of dust particles and volatilization of contaminants during wet periods is very high. For this reason, the TWC and EPA decided to address the RI/FS activities relating to the road as one operable unit, and to consider the storage pits and other site contamination at a later date.

Description of Feasibility Study

The RI/FS developed the following objectives for the Frontier Park Road operable unit: (1) prevention of direct contact with highly contaminated soils; (2) minimization of direct contact with moderately contaminated soils; and (3) improvement of access to the site for heavy equipment to facilitate RI sampling and monitoring and future remedial actions.

During the detailed analysis of alternatives the following eight remedies were considered:

(1) On-site storage with relocation;

(2) On-site storage with detours;

(3) Off-site disposal with relocation;

(4) Off-site disposal with detours;

(5) Fence around perimeter of contaminated area, pavement cover on contaminated soils, and temporary alternative access;

(6) Removal of contaminated soils to attain background levels of contamination, and off-site disposal;

(7) Construction of surface barrier; and

(8) No action.

The alternatives were evaluated and rated with respect to performance, reliability, engineering implementability/constructability, environmental impacts, costs, the requirements of CERCLA for using permanent solutions and treatment technologies, and ability to meet applicable or relevant and appropriate requirements (ARARs). The RI/FS identified the following ARARs: Resource Conservation and Recovery Act (RCRA) Part 264 General Facilities, Ground-water Protection, and Closure regulations; and the Clean Air Act (CAA) National Ambient Air Quality Standards (NAAQS). The Federal Water Quality Criteria (WQC) are also listed in the ROD as ARARs, but the ROD does not indicate whether any of the proposed remedies will attain these criteria.

Public meetings concerning the site were held in November 1985 and November 1986. Because of the public's interest in the site, a State disposal permit was revoked in 1974; citizens currently are concerned that the site might be used for future disposal of waste from other Superfund sites. Residents were also concerned about drainage and health problems associated with the contamination.

Description of Selected Remedy

The recommended alternative was on-site storage with relocation (Alternative 1), and involved excavation and removal of highly contaminated soil, backfilling with clean soil, temporary on-site storage of soil, construction of a road over excavated areas and existing roadway, and temporary relocation of residents during excavation.

EPA indicated that the chosen remedy is expected to comply with ARARs, and is the lowest-cost remedy that mitigates short- and long-term threats to human health and the environment. Operation and maintenance of the on-site RCRA storage area will consist of maintaining and operating a leachate collection system. EPA will conduct operation and maintenance of the leachate collection system for the first year after which time the State of Texas will assume full responsibility. EPA will be responsible for the operation and maintenance of the road and temporary storage facility until a final remedy is selected.

CONSERVATION CHEMICAL COMPANY SITE
KANSAS CITY, MISSOURI

HRS Score: 29.99 **NPL Rank: Group 15**

Background

The Conservation Chemical Company (CCC) site is located within the city limits of Kansas City, Missouri. The 6-acre site is situated on the floodplain of the Missouri River and is underlain by the Missouri River alluvium, a source of drinking water both for private residents and public water-supply companies. From 1960 to 1980, the site was used as a chemical treatment and disposal area, and it received liquids, solids, and sludges. Operating records indicate that the CCC facility received as much as 330,000 tons of material, primarily composed of organics, solvents, acids, metal hydroxides, cyanide, pesticides, waste oils, and halogenated compounds. Most of the materials reportedly were disposed of on site, with or without treatment, in large basins or lagoons.

In 1975, the Missouri Department of Natural Resources (MDNR) investigated the site and requested that CCC cease the disposal of wastes and take remedial action to clean up the site. In 1977, the Missouri Clean Water Commission ordered the site closed and covered. CCC submitted a plan for closure in 1979 that called for adding adsorbents and cementing materials to the upper five feet of waste of each basin as a temporary measure to prevent migration. Tests conducted on samples in 1985, however, indicated that the desired cement-like properties had not formed.

EPA and MDNR located potentially responsible parties (PRPs) for the wastes disposed of at the CCC site. The PRPs, including IBM, AT&T Technologies, Inc., Armco, Inc., and FMC Corporation, undertook a Remedial Investigation (RI) in the early 1980s to determine the extent of ground-water contamination. EPA entered into a joint agency agreement with the U.S. Army Corps of Engineers (COE) to complete a Focused Feasibility Study (FFS) in 1985. An Addendum to the FFS was completed in 1987 after EPA determined that the initial alternative recommended for the site would be difficult to implement. The ROD for the site was signed September 30, 1987.

Description of Site Work

The RI conducted by the PRPs identified 21 substances in ground water beneath the site in concentrations that substantially exceeded the applicable criteria or standards for water quality. The primary constituents identified were six metals, cyanide, four phenolic compounds, and 10 volatile organic compounds (VOCs). Dioxin also was detected in concentrations as high as 29 parts per billion (ppb). (A level of 1 ppb is recommended as a guideline for permissible concentrations where direct contact is likely.) The RI also indicated that the greatest exposure pathway was associated with wastes buried at the site that were in contact with the aquifer; the second pathway of exposure was contaminated surface soils.

Description of Feasibility Study

The original joint EPA/COE FFS assembled available technologies into nine combinations of alternative remedial actions, and also proposed a "no action" alternative. Of these, the government chose circumference containment of wastes and on-site ground-water withdrawal and treatment as the preferred option. Additional geotechnical analysis, however, revealed that implementation of this remedy would be more difficult than originally believed. Because of this, and because the SARA amendments to CERCLA in 1986 added new criteria for the evaluation of remedies, an Addendum to the FFS was prepared to consider additional remedial action alternatives.

The Addendum to the FFS conducted by the COE developed alternatives for remedial actions that met the statutory preferences of CERCLA, including use of permanent solutions and alternative treatment technologies to the maximum extent practicable, compliance with all Federal and State applicable or relevant and appropriate requirements (ARARs), and protection of human health and the environment. In addition to the preferred alternative under the initial FFS, the Addendum proposed two additional remedies for full evaluation against the CERCLA criteria:

(1) On-site containment of contaminants by ground-water pumping and on-site treatment; and

(2) Excavation of hazardous materials, followed by soil treatment.

ARARs identified during the Addendum to the FFS for ground-water remediation at this site included Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs) and Maximum Contaminant Level Goals (MCLGs); Clean Water Act (CWA) Water Quality Criteria, health advisories, Potency Factors, and verified Reference Doses; and Resource Conservation and Recovery Act (RCRA) ground-water protection standards. ARARs for discharges to the Missouri River included the CWA and the Missouri Clean Water Law. ARARs for soil remediation included RCRA closure requirements.

Public notices were issued requesting comments on the draft RI, FFS, and the addendum to the FS, a court hearing with defendants, the completion of the Addendum to the FFS, and the selection of the final remedy. However, few comments were received from the public.

Description of Selected Remedy

The alternative selected was containment of contaminants through an on-site ground-water pump and treatment system. Specifically, this remedy incorporates surface cleanup, a protective surface cap, a withdrawal well system, a ground-water treatment system, and an off-site ground-water quality monitoring system. This remedy was determined to be protective of human health and the environment, cost-effective, and in compliance with the statutory mandate to achieve all ARARs. The State of Missouri concurred with the final remedy selected.

MINKER/STOUT/ROMAINE CREEK SITE
ROMAINE CREEK OPERABLE UNIT
JEFFERSON COUNTY, MISSOURI

HRS Score: 36.78 **NPL Rank: 474**

Background

The Minker/Stout/Romaine Creek hazardous waste site is located in Jefferson County, Missouri, approximately 20 miles southwest of St. Louis. Romaine Creek, located in a rural residential area, starts at the Minker area and flows 4.6 miles to its confluence with Saline Creek, which empties into the Meramec River 0.2 miles down-stream. The water from Romaine Creek is used neither for domestic water supply nor for municipal or industrial purposes.

Romaine Creek is contaminated with dioxin from the erosion of 120 cubic yards of soil deposited at the Minker property, which is being addressed as a separate operable unit. The contaminants in Romaine Creek originated from a chemical plant in southwest Missouri, that produced hexachlorophene and dioxin in the late 1960s and early 1970s. In March 1973, dioxin-contaminated soil was deposited at several locations that now constitute the individual portions of the Minker/Stout/Romaine Creek site. Since 1973, a significant quantity of the Minker fill has eroded into Romaine Creek. The Stout area, which is being addressed as another operable unit, is nearby, but not adjacent to, the Minker area. Because of the similarities of the three areas, the remedial action selection process for all three operable units was conducted simultaneously.

Cleanup actions taken to date include the excavation of soils exceeding 1 ppb dioxin at the Minker area in 1986, and the posting of warning signs along the contaminated portion of Romaine Creek. The Romaine Creek Operable Unit Feasibility Study (FS) was completed in July 1987, and the ROD for the interim remedy was signed September 28, 1987.

Description of Site Work

EPA initially sampled and analyzed Romaine Creek sediments for dioxin in 1982. On the basis of 150 samples, EPA determined the dioxin contamination at a level of 1 ppb extended approximately 6,000 feet downstream from the Minker area. In 1985, biota and additional sediment samples were collected, revealing dioxin concentrations as high as 36.3 ppb 0.5 mile downstream from the site, and concentrations of 0.3 ppb 4.5 miles downstream from the site. The biota sampling detected dioxin in all aquatic species sampled (fish, crayfish, and amphipods) at levels greater than 50 parts per trillion (ppt).

Description of Feasibility Study

The objectives of the EPA lead FS included: (1) preventing or reducing long-term human contact with soils containing dioxin at concentrations exceeding 1 ppb, the level that is determined to be protective of human health and the environment; and (2) minimizing the potential for off-site migration of dioxin. The following operable unit remedial action alternatives were developed:

(1) No Action;

(2) Limited action -- implementation of site-use restrictions, and annual monitoring of Romaine Creek and nearby wells;

(3) Stabilization of sediments to achieve maximum of 1 ppb dioxin contamination using vegetation and manufactured erosion-control mats;

(4) Excavation to 1 ppb and temporary on-site storage; and

(5) Complete excavation and storage of all sediments within Romaine Creek.

Because the operable unit alternatives evaluated for this FS represent only part of the complete remedy for Romaine Creek, it is not necessary for them to comply with applicable or relevant and appropriate requirements (ARARs) for the entire site. All operable unit alternatives evaluated are consistent with final remedial actions; these final remedial actions potentially could meet all ARARs. ARARs identified for this operable unit include land disposal restrictions for dioxin-contaminated wastes and Resource Conservation and Recovery Act (RCRA) storage requirements.

As with the Stout and Minker operable units, affected residents are in general agreement that the contaminated soil should be excavated and transported off site for treatment and disposal. Given the absence of an off-site management option, the public is expected to accept interim storage as the only alternative available at this time. Some local objection is expected near the location where the required on-site storage structures will be built. The state has indicated its support for excavation and interim storage of sediments with contamination exceeding 1 ppb dioxin at Romaine Creek.

Description of Selected Remedy

The remedy selected for this operable unit involves excavation of creek sediments with greater than 1 ppb dioxin contamination by using vacuum equipment or other appropriate means. Innovative excavation techniques, particle separation technologies, and other procedures capable of reducing the amount of material removed from the creek (and reducing environmental disturbance) will be examined during the design phase. Excavated sediments will be stored in four fully-enclosed temporary storage structures constructed on-site until a final treatment, storage, or disposal option can be selected. If a final management alternative becomes available, it is possible that contaminated soil can be taken directly to the location where final management is available. The Agency has proposed off-site thermal treatment of contaminated soils as a final remedy. Such a remedy would satisfy CERCLA statutory preferences for permanent, treatment-based remedies.

This remedy mitigates the potential for human and environmental contact with contaminated sediments and reduces the possibility of continued erosion of these sediments. In addition, it is more protective, reliable, and implementable than other alternatives, and it results in less environmental disruption than complete excavation of all sediments.

MINKER/STOUT/ROMAINE CREEK SITE
STOUT OPERABLE UNIT
JEFFERSON COUNTY, MISSOURI

HRS Score: 36.78 **NPL Rank: 474**

Background

The Minker/Stout/Romaine Creek hazardous waste site is located in Jefferson County, Missouri, approximately 20 miles southwest of St. Louis. The Stout site, comprises five properties (the Vogt property, the Sutton property, and the former Hutchinson, Cisco, and Baczynski properties) and is located near the top of a steeply sloping hillside in an unincorporated, low-density area near Imperial, Missouri.

Dioxin contamination exists in surficial soils on most of the Sutton property and on adjacent portions of the Vogt and Hutchinson properties. The contaminants originated from a chemical plant in southwest Missouri, which produced hexachlorophene and dioxin in the late 1960s and early 1970s. In March 1973, dioxin-contaminated soil was deposited at several locations that now constitute the individual portions of the Minker/Stout/Romaine Creek site. Approximately 700 cubic yards of this soil were deposited at the Stout area. The Minker/Stout/Romaine Creek site also includes the Minker area, a tract of land nearby, but not adjacent to, the Stout area, and Romaine Creek, a contaminated creek running from the Minker area. Each of these areas is being addressed as a separate operable unit. Because of the similarities of the three areas, however, the remedial action selection process for all three operable units was conducted simultaneously.

Remedial actions performed by EPA to date include the permanent relocation of three residences following discovery of dioxin contamination in 1982. The Stout Operable Unit Feasibility Study (FS) was completed in July 1987, and the ROD for the interim remedy selected was signed September 28, 1987.

Description of Site Work

Several investigations of soil contamination at the Stout area were conducted during 1982, 1983, and 1986. These investigations indicated that dioxin levels in the soil (up to 241 ppb) require remediation to assure protection of human health and the environment. According to 1983 sampling, contamination was limited to the Stout area and approximately 800 feet along an unnamed intermittent stream. A maximum dioxin concentration of 11 ppb has been detected in this portion of the stream. The 1986 sampling indicated that the areal extent of contamination exceeding 1 ppb is approximately 1.1 acres.

Description of Feasibility Study

The objectives of the FS conducted by EPA included: (1) prevention or reduction of long-term human contact with soils containing dioxin at concentrations exceeding 1 ppb, the level at or below that which is determined to be protective of public health and the environment; and (2) minimization of the potential for off-site migration of dioxins. The following five remedial action alternatives were developed for the site:

(1) No action;

(2) Limited action -- implementation of site-use restrictions, seeding of sparsely vegetated areas, and surface-water controls and annual monitoring;

(3) Stabilization of soils to achieve maximum of 1 ppb dioxin contamination;

(4) Excavation to achieve maximum of 1 ppb dioxin concentration and temporary on-site storage; and

(5) Complete excavation and storage.

Because the operable unit alternatives evaluated for this FS represent only part of the complete remedy for the Stout area, it is not necessary for them to comply with applicable or relevant and appropriate requirements (ARARs) for the entire site. All operable unit alternatives evaluated are consistent with final remedial actions; these final remedial actions potentially could meet all ARARs. ARARs identified for this operable unit include land disposal restrictions for dioxin-contaminated wastes, and Resource Conservation and Recovery Act (RCRA) storage regulations.

Affected residents are in general agreement that the contaminated soil should be excavated and transported off site for treatment and disposal. Given the absence of an off-site management option, the public is expected to accept interim storage as the only alternative available at this time. Some local objection is expected near the location where the required on-site storage structures will be built. The State of Missouri has indicated its support for excavation and interim storage of soils with contamination exceeding 1 ppb dioxin at the Stout area.

Description of Selected Remedy

The remedy selected for this operable unit involves excavation of soils with contamination exceeding 1 ppb dioxin to a maximum depth of 4 feet of bedrock. Excavated areas will be backfilled to original grade with clean material and revegetated. Excavated soil will be stored in four fully-enclosed temporary storage structures constructed on site, until a final treatment, storage, or disposal option can be selected. If a final management alternative becomes available, it is possible that contaminated soil can be taken directly to the location where final management is available. Although a final remedy has not been selected for the entire site, the Agency has proposed off-site thermal treatment of contaminated soils. Such a remedy would satisfy CERCLA statutory preferences for permanent, treatment-based remedies.

The selected remedy is cost-effective and protects human health and the environment by reducing the potential for continued erosion of contaminated soils. In comparison with the selected remedy, complete excavation of the entire fill area cannot be justified at the additional cost because both alternatives reduced surface dioxin concentrations to below 1 ppb, the level that assures protection of public health and the environment. Stabilization of contaminated soils was not proposed due to the uncertainty of successful implementation and high operation and maintenance requirements.

CLEAR CREEK/CENTRAL CITY SITE
OPERABLE UNIT I
CLEAR CREEK AND GILPIN COUNTIES, COLORADO

HRS Score: 51.39 **NPL Rank: 157**

Background

The Clear Creek/Central City site is located in the northeastern portion of the Colorado Mineral Belt, approximately 30 miles west of Denver, Colorado, near the cities of Idaho Springs, Black Hawk, and Central City. Acid mine drainage and milling and mining waste discharges from five abandoned mines and tunnels at the site caused surface-water contamination consisting of dissolved and suspended metals, including aluminum, cadmium, and lead.

The Clear Creek/Central City mining site is one of the more extensively mined areas in Colorado. Mining and construction of the tunnels began in the early 1900s, and the entire area includes over 800 abandoned mine workings and tunnels. The Clear Creek/Central City site was added to the NPL in 1983, and EPA began a Remedial Investigation (RI) for the entire site in June 1985. During the RI, EPA determined that an interim remedy operable unit was needed to address treatment of mine drainage. A feasibility study (FS) for the Operable Unit I remedy was completed in June 1987 and the ROD was signed September 30, 1987. Separate FSs will be prepared for Operable Units II through III to address additional site degradation. The determination of the final remedy is contingent upon the completion of the operable units.

A potentially responsible party (PRP) search did not identify any PRPs for the mine tunnel discharges, which are the focus of Operable Unit I. The PRP search, however, revealed information concerning ownership of mine tailings which have been identified as a source of metals contamination of surface water resulting from seepage of ground water through the tailing piles. Operable Unit II will address contamination from this source.

Description of Site Work

The RI for the entire site was completed in June 1987 and indicated that concentrations of metals in the mine tunnel discharges exceed Federal drinking water standards. Ambient water quality criteria, which are designed to protect aquatic life, have also been exceeded, in certain instances by more than two levels of magnitude. A public health evaluation (PHE) identified eleven contaminants of concern: aluminum, arsenic, cadmium, chromium, copper, fluoride, lead, manganese, nickel, silver, and zinc. Risks to human and aquatic life are associated with exposure to surface water from ingestion and direct contact. The PHE showed that there is no immediate danger from mine tunnel discharge at present flow rates, although mine tunnel discharges have had severe adverse impacts on water quality and the aquatic habitat.

Description of Feasibility Study

Alternatives identified in the FS were initially screened on the basis of cost, effectiveness, and implementability. These remaining alternatives were subject to a detailed analysis:

(1) No action;

(2) Passive treatment -- creation of an artificial wetland to emulate or enhance natural metal ion removal and acidity reduction processes;

(3) Active treatment -- alkaline precipitation (using lime, sodium hydroxide, or sulfide) or electrochemical precipitation; and

(4) Combination of active and passive treatment.

Contaminant-specific ARARs for the site are Maximum Contaminant Levels (MCLs) under the Safe Drinking Water Act (SDWA) and Ambient Water Quality Criteria (AWQC) established under the Clean Water Act (CWA). State ARARs include State water quality and anti-degradation standards. Location- and action-specific ARARs include historic preservation regulations, executive orders on floodplains and wetlands, the National Pollution Discharge Elimination System (NPDES), and Subtitle D of the Resource Conservation and Recovery Act (RCRA).

Community relations at the site included public meetings after the release of the Operable Unit I FS, the establishment of information repositories, and establishment of the administrative record.

Description of Selected Remedy

The selected interim remedy for Operable Unit I consists of construction of passive treatment systems to treat mine tunnel discharges prior to discharge to surface waters (Alternative 2). If upstream water quality concentrations cannot be achieved by passive treatment, then one of the following two treatment systems will be constructed:

- Combination system of passive and active treatment; or
- Two active treatment systems.

The selected interim remedy is cost-effective and is expected to be protective of human health and the environment. Target treatment levels for the interim remedy are upstream water quality concentrations. The interim remedy requires the exercise of the CERCLA section 121 "interim remedy" waiver from contaminant-specific ARARs. EPA intends that the final remedy will, at least, attain water quality criteria established under the CWA. The interim remedy is expected to be consistent with the final site remedy. In addition, passive treatment is an innovative technology, and the installation of either of the treatment systems meets the CERCLA statutory preference for permanent solutions that reduce the mobility, toxicity, or volume of metals in the discharge.

DENVER RADIUM SITE
OPERABLE UNIT I -- 12th AND QUIVAS PROPERTIES
DENVER, COLORADO

HRS Score: 44.11 **NPL Rank: 284**

Background

Operable Unit I of the Denver Radium site consists of 4 of the more than 31 radioactive properties that EPA has identified in the Denver area. The radioactive contamination at the Denver Radium site properties originated from a number of radium, vanadium, and uranium processing operations conducted during the 1910s and 1920s. Because of the enormity of the Denver Radium site, EPA divided the site into 11 operable units. Operable Unit I is located at the 12th and Quivas Streets properties in the City of Denver, where releases of radium and its associated decay products are the hazardous substances of primary concern. The properties cover approximately 8 acres in an area zoned for industrial use and currently are in use for business operations by various companies. Until 1924, the Pittsburgh Radium Company, a division of the National Vanadium Products Company, refined radium-bearing ore at the site location, and the current contamination is believed to be the result of this Company's operations.

After EPA identified all 31 contaminated properties, the Radiation Control Division of the Colorado Department of Health (CDH) notified property owners of the presence of radium and requested that no excavation be undertaken without consultation with CDH. In August 1981, CDH, in a cooperative agreement with EPA, initiated investigation of many of the 31 properties. EPA installed a vented-plenum wall in the basement of the B&C Metal Products building, which is included in Operable Unit I, to reduce radon decay product concentrations. EPA did not take further emergency response actions at the site because the patterns of occupancy and the concentrations of contaminants during periods of occupancy reduced the significance of long-term exposure.

The entire Denver Radium site was included on the final NPL published in September 1983. EPA assumed Fund lead activities in June 1983 because the Colorado State Legislature failed to appropriate the cost-share required. EPA initiated the Remedial Investigation (RI) in December 1983, and the RI for all operable units was completed in April 1986. The draft Operable Unit I feasibility study (FS) was released in August 1987, and the ROD was signed September 29, 1987.

A potentially responsible party (PRP) search has not traced the Pittsburgh Radium Company to any firm that is currently operating. EPA is proceeding with a Fund-financed remedial design and remedial action. If PRPs are identified, EPA will attempt to recover response costs from the PRPs.

Description of Site Work

Radium and its associated decay products are the primary contaminants of concern. Long-term exposure to these substances has been shown conclusively to increase the risk of contracting lung cancer. EPA used a gamma radiation survey to outline the extent of possible radium contamination and verified the presence of radium in the soil and underneath the buildings on site by radio-chemical analysis of subsurface soil samples. Radium concentrations, gamma radiation levels, and radon decay product concentrations found in three buildings on the site were of concern because they exceeded the EPA Standards for Remedial Actions at Inactive Uranium Processing Sites.

Description of Feasibility Study

EPA evaluated remedial alternatives against the CERCLA requirements that a remedy be protective of human health and the environment; cost effective; attain Federal and State applicable or relevant and appropriate requirements (ARARs); and use permanent solutions and alternative treatment technologies to the maximum extent practicable, with preference for remedies that permanently and significantly reduce the toxicity, mobility, or volume of hazardous substances. The alternatives developed in the FS were:

(1) No action;

(2) Deferred removal and off-site permanent disposal;

(3) On-site reprocessing/treatment and off-site permanent disposal;

(4) *In situ* vitrification;

(5) On-site permanent disposal;

(6) Off-site permanent disposal;

(7) On-site temporary land storage and off-site permanent disposal;

(8) On-site temporary building storage and off-site permanent disposal;

(9) On-site temporary containment (capping) and off-site permanent disposal; and

(10) Temporary storage at the Card Corporation property and off-site permanent disposal.

Federal ARARs identified for the site included: the EPA Standards for Remedial Action at Inactive Uranium Processing Sites, the Nuclear Regulatory Commission Standards for Protection Against Radiation, the National Council on Radiation Protection and Measurements, and the International Commission on Radiological Protection recommendations for gamma radiation doses.

In July 1987, EPA met with the owners and tenants of the properties on the site. Topics discussed included concerns about adverse publicity to the firms on site and details of the remedial action phase. In August 1987, EPA held a public meeting where concerns raised included the effect of the remedial action on business operations on site and the liability of owners and tenants. The public generally supported the complete excavation and permanent off-site disposal of all materials.

Description of Selected Remedy

The initial preferred alternative for the site was permanent off-site disposal. Until the State of Colorado agrees to a permanent disposal site for material removed from the properties, however, this alternative cannot be implemented. Consequently, the remedial design for Operable Unit I includes on-site temporary containment and off-site permanent disposal. The temporary response action consists of capping the contamination at the properties and excavating materials from under three buildings and temporarily storing them on site. The final and permanent source control response action will occur when a disposal facility becomes available. Included in the remedy is review of the site pursuant to CERCLA section 121(c) if any hazardous materials remain on site for more than 5 years.

The selected alternative is cost-effective, is expected to meet ARARs, and provides adequate protection of public health and the environment. The selected remedy, however, does not satisfy the preference for treatment as a principal element. Because of the radioactive nature of radium, no technology was identified that would result in a permanent or significant decrease in the toxicity, mobility, or volume of the radium on site.

DENVER RADIUM SITE
OPERABLE UNIT II -- 11TH AND UMATILLA PROPERTIES
DENVER, COLORADO

HRS Score: 44.11 **NPL Rank: 284**

Background

Operable Unit II of the Denver Radium site consists of 11 of the more than 31 radioactive properties that EPA has identified in the Denver metropolitan area. The radioactive contamination at the Denver Radium site properties originated from a number of radium, vanadium, and uranium processing operations conducted during the 1910s and 1920s. Because of the enormity of the Denver Radium Site, EPA divided the site into 11 operable units. The 11 properties in Operable Unit II cover approximately 24 acres and are currently used for various business operations. The contaminants of concern, radium and its decay products, can be traced to the Radium Company of Colorado, which processed radium-bearing ore on the Operable Unit II site until 1921.

After EPA identified the 31 radioactive properties, the Radiation Control Division of the Colorado Department of Health (CDH) contacted the owners of the properties and requested that no excavation be done on the site without notification of the Division. In 1981, CDH, in a cooperative agreement with EPA, assumed lead activities at the Denver Radium site. Among other activities on the Operable Unit II, CDH and EPA oversaw the installation of subfloor venting measures and a vapor barrier at the DuWald Steel property to prevent radon from entering the building. The entire Denver Radium site was included on the NPL in September 1983. EPA assumed Fund lead activities in 1983 when the Colorado State Legislature failed to appropriate the State cost share. The Remedial Investigation (RI) for all the operable units was completed in April 1986. The feasibility study (FS) for Operable Unit II was completed in August 1987, and the ROD was signed September 29, 1987.

A potentially responsible party (PRP) search has failed to trace the Radium Company of Colorado to a present-day company. If PRPs are identified, EPA will contact them and initiate negotiations for the implementation of the remedy or take action to recover EPA's response costs.

Description of Site Work

Sampling conducted during the EPA lead RI indicated that radium concentration in the soils and the radon decay product concentrations and gamma radiation levels in certain buildings exceeded the EPA Standards for Remedial Actions at Inactive Uranium Processing Sites. Long-term exposure to radium and its decay products has been shown conclusively to increase the risk of contracting lung cancer. Although radon levels in two buildings on the Operable Unit II site exceed the EPA standards, EPA took no emergency action because one building is presently unoccupied, and the patterns of occupancy in the other building reduce the chances of significant long-term exposure. The RI indicated that contaminants at the site pose a health risk through three potential exposure pathways: inhalation, direct gamma radiation exposure, and ingestion of radium-contaminated materials. The health risk at the site results from possible long-term exposure, and this exposure would increase if any of the contaminated material was to become more accessible, if the property was redeveloped, or if the buildings on site became more airtight or more heavily used.

Description of Feasibility Study

The FS for the 11 properties in Operable Unit II evaluated alternatives in accordance with the CERCLA requirements that a remedy be protective of human health and the environment, cost-effective, attain Federal and State applicable or relevant and appropriate requirements (ARARs), and use permanent solutions and alternative treatment technologies to the maximum extent practicable. After an initial screening, the following remedial alternatives were retained for detailed analysis:

(1) No action;

(2) Deferred removal and off-site permanent disposal;

(3) On-site temporary land storage and off-site permanent disposal;

(4) On-site temporary building storage and off-site permanent disposal; and

(5) Temporary building storage at the Card Corporation property and off-site permanent disposal.

Federal ARARs identified for the site include the EPA Standards for Remedial Actions at Inactive Uranium Processing Sites, and the Nuclear Regulatory Commission Standards for Protection Against Radiation. The FS also identified the Executive Order on Flood Plain Management as a potential location-specific ARAR. Other Federal ARARs considered included the National Council on Radiation Protection and Measurements and the International Commission on Radiological Protection (ICRP) recommendations for maximum gamma radiation dose to the entire body. Additionally, to comply with CERCLA section 104(c) and EPA's off-site disposal policy, the State of Colorado must make available a disposal facility.

A public meeting was held in August 1987. Major concerns of those who attended the meeting were the effect of the remedial action on business operations at the site, the liability of the owners at the site, and the cost of the remedial action. In general, the community had reservations about temporary actions that leave contaminants on site and, consequently, the public supported the excavation and permanent off-site disposal of the contaminated material.

Description of Selected Remedy

The selected remedy for Operable Unit II of the Denver Radium site is on-site temporary land storage and off-site permanent disposal. When the State of Colorado agrees to a disposal facility, EPA will implement its preferred alternative, off-site permanent disposal.

The alternative is protective of the public health, is expected to attain ARARs, and is cost effective. Because of the radioactive nature of radium, no technology was identified that would result in a permanent and significant decrease in the toxicity, mobility, or volume of the hazardous substance.

DENVER RADIUM SITE
OPERABLE UNIT III -- 1000 WEST LOUISIANA PROPERTIES
DENVER, COLORADO

HRS Score: 44.11 **NPL Rank: 284**

Background

Operable Unit III of the Denver Radium site consists of five of the more than 31 radioactive properties that EPA has identified in the Denver area. The radioactive contamination at the Denver Radium site properties originated from a number of radium, vanadium, and uranium processing operations conducted during the 1910s and the 1920s. Because of the enormity of the Denver Radium site, EPA divided the site into 11 operable units. The Operable Unit III properties, known collectively as the 1000 West Louisiana properties, cover 11 acres in an area zoned for industrial use and currently are being used for business operations.

After EPA identified the 31 contaminated properties, the Radiation Control Division of the Colorado Department of Health (CDH) notified property owners of the presence of radium and requested that no excavation be undertaken without consultation with CDH. In August 1981, CDH, in a cooperative agreement with EPA, initiated investigation of many of the 31 properties. Although radon decay levels in the basement of the Creative Illumination Building at the West Louisiana properties site exceeded EPA standards, an emergency response action was not taken because the patterns of occupancy and the concentrations of radon decay products present were such that significant long-term exposure risk was considered unlikely.

The entire Denver Radium site was included on the final NPL published in September 1983. EPA assumed Fund lead activities in June 1983 because the Colorado State Legislature failed to appropriate the cost-share required. EPA initiated the Remedial Investigation (RI) in December 1983, and the RI for all operable units was completed in April 1986. The draft Operable Unit III feasibility study (FS) was released for public review in August 1987, and the ROD was signed September 29, 1987.

Records indicated that the Chemical Products Company (CPC) operated a processing facility at the Operable Unit III site from 1918 to 1921 and disposed of ore processing wastes containing radium. Sources indicated that CPC may have been a division of the Ludlum Steel Company and may also have been associated with the Ore Products Company. A potentially responsible party (PRP) search has not traced CPC to a present-day entity and has not revealed that the present owners of the properties have any connection to the activities that caused the radioactive contamination. EPA is proceeding with a Fund-financed remedial design and remedial action and will attempt to recover costs if PRPs are identified.

Description of Site Work

Radium and its decay products are the primary contaminants of concern. Long-term exposure to these substances has been shown conclusively to increase the risk of contracting lung cancer. EPA used a gamma radiation survey to outline the extent of possible radium contamination. The presence of radium in the soil and beneath the buildings was verified by radio-chemical analysis of subsurface soil samples. A small number of polynuclear aromatic hydrocarbons (PAHs) and volatile organic compounds were also found in on-site soils. The radium concentration in the soils on the properties and the radon decay product concentrations and gamma radiation levels found in one of the buildings exceeded EPA standards. In addition, alpha radioactivity levels in the building exceeded State of Colorado guidelines.

The elevated concentrations of radium at the properties present a health risk through three potential exposure pathways: 1) inhalation of radon gas, the immediate decay product of radium; 2) direct gamma radiation exposure; and 3) ingestion or inhalation of radium contaminated materials.

Description of Feasibility Study

The Operable Unit III FS identified the following remedial alternatives as those warranting in-depth evaluation:

(1) No action;

(2) Deferred removal and off-site permanent disposal;

(3) On-site temporary land storage and off-site permanent disposal;

(4) On-site temporary building storage and off-site permanent disposal;

(5) On-site temporary containment (capping) and off-site permanent disposal; and

(6) Temporary building storage at the Card Corporation property and off-site permanent disposal.

Federal ARARs identified for the site included: the EPA Standards for Remedial Action at Inactive Uranium Processing Sites, the Nuclear Regulatory Commission Standards for Protection Against Radiation, the National Council on Radiation Protection and Measurements, and the International Commission on Radiological Protection recommendations for gamma radiation doses.

In July 1987, EPA met with the owners and tenants of the properties on the site. Neighboring homeowners expressed concern over whether their homes were contaminated from the 1000 West Louisiana properties and the cost of the remedial action. In general, the public supports the complete excavation and permanent off-site disposal of all contaminated materials.

Description of Selected Remedy

EPA's preferred remedial action alternative for the 1000 West Louisiana properties is off-site permanent disposal. This alternative, however., cannot be implemented until the State of Colorado provides a permanent disposal site. Consequently, the remedial action for Operable Unit III is temporary building storage at the Card Corporation property for material from the Creative Illumination Building and on-site storage for the remainder of the material from the property. Off-site permanent disposal (Alternative 6) will be implemented once a permanent disposal facility becomes available. The remedy will include review of the site pursuant to CERCLA section 121(c) if any hazardous materials remain on site for more than 5 years.

The selected alternative is cost-effective, is expected to meet ARARs, and provides adequate protection of public health and the environment. The selected remedy, however, does not satisfy the preference for treatment that a principal element because no technology was found which would result in a permanent and significant decrease in the toxicity, mobility, or volume of the radioactive substance, radium, on-site.

DENVER RADIUM SITE
OPERABLE UNIT X -- CARD CORPORATION PROPERTY
DENVER, COLORADO

HRS Score: 44.11 **NPL Rank: 284**

Background:

The Denver Radium site includes the remains of several radium processing facilities that operated in the 1910s and 1920s. Included in these radium processing operations are facilities developed by the U.S. Bureau of Mines and a private corporation, the National Radium Institute (NRI). In 1979, references in a 1916 NRI report led EPA to discover 31 sites contaminated with radioactive materials in the Denver area. One of these sites is the 17-acre Card Corporation property, which was used as a radium processing facility from 1920 to 1924 by the Pittsburgh Radium Company. The industrial-zoned site was owned by the Card Corporation when radiological contamination was discovered. Mentor Corporation acquired the property in 1977 without having knowledge of the contamination on the site.

The Denver Radium site was placed on the final NPL in September 1983. Due to its enormity, the Denver Radium site has been divided into 11 operable units, of which the Card Corporation property is Operable Unit X. The Colorado Department of Health (CDH) assumed the lead in assessing the various properties in August 1981. However, the current owner of the Card Corporation property, the Mentor Corporation, denied the State access to the site. Subsequently, an EPA lead Remedial Investigation (RI) of the entire Denver Radium site was initiated in December 1983. Draft feasibility studies (FS) for the Card Corporation property Operable Unit were released in 1986 and 1987, and the ROD was signed June 30, 1987.

A search for potentially responsible parties (PRPs) for the entire Denver Radium site has been initiated, but no PRPs have been identified as responsible for the contamination on the Card Corporation property. The attempt to trace the Pittsburgh Radium Company to a present-day company has been unsuccessful. EPA is negotiating a covenant with Mentor not to sue for potential liability resulting from a release of hazardous substances at the site. In return, Mentor would provide EPA access to its property for storage of radium-contaminated materials from other units at the Denver Radium site.

Description of Site Work

The EPA lead RI, completed in April 1986, indicated that the contaminant of concern at the Card Corporation property is radium. Results of a gamma-radiation survey indicated that radium was present in the soil, in buildings, and underneath the buildings. The radium concentration potentially poses a health hazard through three principal exposure pathways: (1) inhalation of radon gas, the immediate decay product of radium, and radon's own short-lived decay products; (2) direct gamma radiation exposure from the decay of radium; and (3) ingestion or inhalation of radium-contaminated materials. Because the radium at this site is in a form that is relatively insoluble, and migration of contaminants into the ground water or pond water was not found, ingestion of radium from contaminated surface water or ground water was not a concern at the Card Corporation property.

Description of Feasibility Study

A first draft of the FS was released for public review in October 1986. Because public concern was so great, the comment period on the FS was extended. The primary concern of the public was that the temporary storage facility would become permanent if the State failed to assure the availability of a permanent disposal site. Subsequently, the City Council passed a resolution opposing the storage of any radioactive waste anywhere in the Denver metropolitan area. Other major concerns raised at the public meeting in November 1986 included: the impacts of cleanup and storage on area property values; the justification for temporary storage; health risks from the cleanup; and the risks from transporting material to the site.

A second draft FS, reflecting comments received on the first draft, was released for public comment in April 1987. It also incorporated CERCLA requirements for considering permanent solutions and use of treatment technologies to the maximum extent practicable and attainment of ARARs. Of nine alternatives originally considered, five remained after screening:

(1) No action;

(2) Deferred removal with off-site permanent disposal;

(3) On-site permanent disposal;

(4) On-site temporary land storage with off-site permanent disposal; and

(5) On-site temporary building storage with off-site permanent disposal.

Several potential Federal and State applicable or relevant and appropriate requirements (ARARs) were identified for the site including: the EPA Standards for Remedial Action at Inactive Uranium Processing Sites; the Nuclear Regulatory Commission Standards for Protection Against Radiation; the National Historic Preservation Act; and the Archeological and Historic Preservation Act. Action-specific ARARs were considered in the course of each remedial alternative.

Description of Selected Remedy

EPA's preferred remedial action alternative was permanent off-site disposal. However, this alternative was eliminated during initial screening because it cannot be implemented until the State of Colorado agrees to a permanent disposal site. Instead, EPA selected a remedy that included temporary on-site building storage with permanent off-site disposal. If a permanent disposal facility becomes available before this alternative is implemented, EPA may implement immediately the permanent off-site disposal alternative.

The selected alternative involves the excavation and temporary storage of approximately 4,000 cubic yards of radium-contaminated soil from the Card Corporation property. When a permanent disposal facility is made available, all material will be removed from the property and transported to the permanent off-site disposal location. The temporary storage building and any additions to the building may be dismantled, decontaminated, and disposed of in a sanitary landfill. This alternative also includes the option of consolidating and storing radium-contaminated material from other Denver Radium site properties. In response to public concerns, however, the duration of temporary storage at the site may not exceed 5 years, and the maximum amount of material that can be temporarily stored is 13,000 cubic yards.

The selected remedy does not satisfy the statutory preference for treatment that reduces toxicity, mobility, or volume of the hazardous substances. Although EPA evaluated several treatment technologies, none were found to be suitable to the site conditions or the type of contamination present on the Card Corporation property.

DENVER RADIUM SITE
OPEN SPACE PROPERTIES -- OPERABLE UNITS VI, IX, AND XI
DENVER, COLORADO

HRS Score: 44.11 **NPL Rank: 284**

Background

The Open Space properties portion of the Denver Radium site includes three operable units (VI, IX, and XI) and consists of 10 properties in Denver, Colorado, that are contaminated with radium and its associated decay products. The radium at these properties is believed to have originated from a number of radium, vanadium, and uranium processing operations conducted at the site in the 1910s and 1920s. Much of the contamination is the direct result of radium and uranium processing on the specific properties or the result of processing wastes being transported to the property from a processing site.

After noting a reference to the National Radium Institute in a 1916 U.S. Bureau of Mines report, EPA performed field research in 1979 that indicated the presence of 31 radioactive sites in the Denver metropolitan area. In August 1981, the Colorado Department of Health, under a cooperative agreement with EPA, assumed lead activities and initiated engineering assessments of the majority of the original 31 properties. Shortly thereafter, the entire site was placed on the Interim Priorities List. EPA resumed Fund lead activities in June 1983 because the Colorado State Legislature failed to appropriate the State cost share for remedial planning required. Because of the enormity of the Denver Radium site, EPA divided the site into 11 operable units, based upon individual property locations and conditions. The Denver Radium site Remedial Investigation (RI) report, which addresses all 11 operable units, was completed in April 1986. The draft feasibility study (FS) for the Open Space properties (Operable Units VI, IX, and XI) was released for public review in August 1987.

A detailed search for potentially responsible parties (PRPs) has identified possible generators of radium contamination for many of the Open Space properties. Records indicate that many companies conducted activities related to the current contamination, but the PRP search has yet to trace any of these companies to a viable, present-day company. The search has not revealed any connection between the current owners of the Open Space properties and the activities that caused the respective properties to be contaminated.

Description of Site Work

During the RI, a gamma radiation survey and subsurface soil samples were taken to determine the extent of possible radium contamination at the Open Space properties. Soil samples verified that radium contamination existed in most of the properties. In all cases where it was detected, radium concentration in the soil exceeded target levels established in the EPA Standards for Remedial Actions at Inactive Uranium Processing Sites. The estimated total volume of radium-contaminated soil at the Open Space properties is 1,458 cubic yards.

The elevated concentration of radium poses a health hazard from three principal exposure pathways: (1) inhalation of radon gas, and radon's own short-lived decay products; (2) direct gamma radiation exposure from the decay of radium; and (3) ingestion or inhalation of radium-contaminated materials. Because the radium is in a form that is relatively insoluble, and because it is not believed that radiological contaminants have migrated into ground or surface water, potential ingestion or contact with these media are not believed to be major health risks.

Description of Feasibility Study

In order to mitigate the health risks posed by radium contamination at the site, the FS developed several remedial action alternatives. After an initial screening based on CERCLA criteria, the alternatives retained for detailed analysis included:

(1) No action (all properties);

(2) Deferred removal and off-site permanent disposal (all properties);

(3) On-site temporary land storage and off-site permanent disposal (Allied, Brannan, PSCo, and Thomas Realty properties);

(4) On-site temporary building storage and off-site permanent disposal (Allied, Brannan, PSCo, and Thomas Realty properties);

(5) On-site temporary containment with a Resource Conservation and Recovery Act (RCRA) cap and off-site permanent disposal (all properties); and

(6) Temporary building storage at the Card Corporation property (located at Operable Unit X) and off-site permanent disposal (all properties).

Applicable or relevant and appropriate requirements (ARARs) identified for the site included: the EPA Standards for Remedial Action at Inactive Uranium Processing Sites, the Nuclear Regulatory Commission Standards for Protection Against Radiation, and the Executive Order for Floodplain Management. EPA also considered the National Council on Radiation Protection and Measurements and the International Commission on Radiological Protection recommendations on maximum gamma radiation in its analysis of alternatives.

Description of Selected Remedy

EPA's preferred remedy for the site was off-site permanent disposal for all properties with radium contamination (Alternative 2). However, this alternative is not immediately implementable because the State of Colorado has not yet agreed to a facility for the disposal of the Denver Radium site wastes and does not expect to have a disposal facility developed in the State before 1992. Therefore, EPA selected a temporary remedy, consisting of the following actions:

- On-site temporary capping of the Allied property and eventual excavation and off-site disposal of contaminated soil; and

- On-site cleanup of six properties; temporary storage of contaminated soil at the Card Corporation property; and eventual permanent off-site disposal of contaminated soil.

The temporary measures included in the selected remedy will provide short-term protection of public health and the environment. The remedy is cost-effective, is expected to attain ARARs, and will comply with EPA's off-site disposal policy. A treatment-based remedy was not chosen for this site because EPA could not identify an implementable and effective technology to reduce the toxicity, volume, or mobility of radioactive wastes.

In general, the public supported the selected remedy. However, the local community does have reservations about any temporary response action because of the fear that the State will not make available a permanent disposal site for this material. In addition, certain elected officials voiced concerns about selecting the "no action" alternative at some of the properties. The portion of the community in the vicinity of the Card Corporation property strongly opposes temporary storage of Open Space material at this property because of the fear that property values will decline.

ROCKY MOUNTAIN ARSENAL SITE
FIRST OFF-POST OPERABLE UNIT
DENVER, COLORADO

HRS Score: 58.15 **NPL Rank: Group 2F**

Background

The Rocky Mountain Arsenal (RMA) site is located in Adams County about 10 miles northeast of Denver, Colorado. The site covers 27 square miles. Adjacent areas known as South Adams County include farm land, with residential subdivisions, industrial facilities, and gravel operations. The RMA post, which is owned and operated by the U.S. Army, was established in 1942 for the production of chemical and incendiary munitions. Subsequently, the property was used to produce pesticides and herbicides under leases to private companies. Substances from both operations, as well as by-products and residues, were disposed of on-site.

Studies conducted in one off-post area in south Adams County by EPA and local authorities indicated that concentrations of volatile organic compounds (VOCs), such as 1,1-dichloroethane and trichloroethylene, were present in the ground-water system. Other possible contaminants include benzene, vinyl chloride, and pesticides. The local water supply system serves about 30,000 customers with water from wells in one portion of the affected alluvial aquifer.

Various government bodies, including EPA, sampled the ground water off-post and identified the RMA as one of three or more sources of the contamination. The EPA lead RMA off-post remedial investigation/feasibility study (RI/FS) was initiated in 1985 to evaluate measures to abate the threat of the off-post contamination; the Army is conducting an RI/FS on-post and in another off-post area. During the course of its RI/FS, EPA determined that an operable unit should be conducted to address replacement or treatment of contaminated ground water being used for the public water supply. Subsequent operable units may address aquifer restoration and source control measures. The ROD for the first off-post operable unit was signed June 4, 1987.

In March 1986, the Army agreed to transfer $1 million to EPA for use in responding to the contamination. The publicly used ground water is currently being treated prior to consumption through a temporary carbon filtration system that will operate until the permanent system selected by the ROD is in place. The temporary action is funded by the Army, and it is being conducted by the local government through a cooperative agreement with EPA. On September 28, 1986, the Army provided EPA with an additional $6 million for response purposes pursuant to the existing enforcement agreement and on September 16, 1987, another $300,000 was provided in another amendment. Under a separate September 18, 1987 agreement, the Army provided another $6 million for the long-term (25 years) operation and maintenance (O&M) of the permanent treatment system, $975,000 for reimbursement of the private well connection costs, and $300,000 for the construction of the permanent system. Total Army funding thus far totals $14.575 million. If EPA identifies other parties potentially responsible for the contamination, it will attempt to recover remaining response costs from them. EPA may also seek additional funding from the Army, under limited circumstances.

In 1986 through 1988, all interested owners of off-post private wells were connected to the public water system when EPA determined that contamination in the alluvial aquifer exceeded Federal limits and posed a threat to public health.

Description of Site Work

Ground-water sampling results collected from various investigations through 1986 indicated the presence of large areas of contaminated water off-post in south Adams County. VOCs were present in the highest concentrations, and detectable levels of contamination were noted in municipal wells. The off-post RI indicated that the contamination was migrating in the ground water in the alluvial aquifer, the primary drinking source for about 30,000 residents. Exposure to VOCs could result from routine domestic use of water, ingestion, inhalation (e.g., during showering), and dermal contact.

Description of Feasibility Study

The FS evaluated 10 alternative remedies to abate the threat of contamination in the drinking water in the EPA off-post study area. To evaluate the 10 alternatives, EPA classified alternatives according to the extent to which a given alternative would approach, attain, or exceed applicable or relevant and appropriate requirements (ARARs). The FS identified a range of potential ARARs, including the Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs), Maximum Contaminant Level Goals (MCLGs), Water Quality Criteria (WQC), and National Emission Standards for Hazardous Air Pollutants (NESHAPS) for vinyl chloride. EPA also identified a number of the State standards as ARARs for the operable unit. In accordance with EPA policy at the time of the FS, EPA designated MCLs as the ARARs that the selected remedy for ground-water remediation must attain. EPA expects that the MCLs will drive the design and operation of the remedy.

EPA reviewed the following 10 alternatives by evaluating their effectiveness, the engineering of the proposed response approach, and cost:

(1) No action;

(2) Alternative water supply;

(3) Air stripping of VOCs;

(4) Air stripping of potential semi-volatile organic compounds;

(5) Air stripping of VOCs with off-gas treatment;

(6) Air stripping of potential semi-volatile organic compounds with off-gas treatment;

(7) Granular activated carbon (GAC) treatment;

(8) Air stripping with off-gas treatment for two wells; GAC for five wells;

(9) Continued use of GAC system leased for removal action; and

(10) Blending.

EPA published three fact sheets on the site during 1986 and held press conferences to keep the public informed of remedial progress. EPA also attended five public meetings and held a public comment period on the draft RI/FS. Community reaction to EPA's preferred alternative (discussed below) was favorable.

Description of Selected Remedy

The recommended remedy is a GAC treatment system with the regeneration of spent carbon (Alternative 7). This cost-effective alternative effectively mitigates and minimizes threats to public health. EPA found the chosen remedy to be the most favorable when comparing alternatives on the basis of technology, reliability, permanency, cost, and effect on the public health.

The GAC system will treat contaminated water from the South Adams County Water and Sanitation District (SACWSD) supply wells prior to its consumption as drinking water. The GAC system will remove the substances of primary concern from the drinking water to levels that will assure protection of human health and attain ARARs. The system will require future operation and maintenance activities to ensure its continued effectiveness.

In the event that vinyl chloride levels increase above the standard and require remediation, the GAC system will be designed so that an air stripper may be added to remediate the vinyl chloride. Spent carbon from the GAC system will be regenerated at an incinerator in compliance with sections 3004 and 3005 of SDWA.

PHOENIX-GOODYEAR AIRPORT SITE
SECTION 16 OPERABLE UNIT
GOODYEAR, ARIZONA

HRS Score: 45.91 **NPL Rank: 254**

Background

The Phoenix-Goodyear Airport (PGA) site is located approximately 17 miles from Phoenix, Arizona. In 1981, the Arizona Department of Health Services (ADHS) discovered that ground water and 18 wells in the PGA area were contaminated by solvents, chromium and trichloroethene (TCE). Drinking water supplies, industrial water supplies, and irrigation water come solely from ground water that is pumped from the aquifer underlying the site area. In addition, development by the City of Goodyear is planned for the area downgradient from the site, and this development will include using ground-water resources currently threatened by contamination. The site was added to the NPL in September 1983.

An operable unit was initiated at the PGA site based on geography and the contaminated media being addressed. The aquifer underlying the site is separated into three units. Subunit A of the aquifer is unsuitable for drinking water. Subunits B and C of the aquifer are potential sources of drinking water and are hydraulically connected. Subunit A is also connected to Subunits B and C by conduit wells and sand lenses. The Operable Unit addresses the ground-water contamination of the upper alluvial aquifer in the southern portion of the site. This operable unit covers 750 acres and includes the Loral Corporation facility (formerly owned by the Goodyear Aerospace Corporation [GAC]) and the Phoenix-Goodyear Airport (formerly owned by the U.S. Navy). Both of these facilities are potential sources of the volatile organic compound (VOC) ground-water contamination.

The EPA lead Remedial Investigation (RI) for the entire site was initiated in 1984. The feasibility study (FS) for the Operable Unit was released in the summer of 1987 and the ROD was signed September 29, 1987. Soil and soil/gas sampling is currently being completed to characterize soil contamination at the site. Consequently, soil and ground-water contamination beyond the area of the operable unit will be addressed in the subsequent FS for the entire site.

EPA identified GAC and the Department of Defense (DOD) as potentially responsible parties (PRPs) at the site. GAC has been participating in the RI/FS process since 1984, and an Administrative Order for RI/FS activities was signed by GAC and EPA in March 1986. The U.S. Corps of Engineers represented the DOD on the Phoenix-Goodyear Airport Interagency Committee, which was established by EPA to involve State and local agencies, as well as PRPs, in actions on the site.

Description of Site Work

The RI examined ground-water contamination in Subunits A, B, and C of the aquifer. In addition to TCE and chromium contamination, elevated levels of compounds including 1,1-dichloroethene, chloroform, and carbon tetrachloride were detected in the ground water at the site. Those identified as potentially affected by contamination were wildlife near the site and the population of the Goodyear/Avondale area. Four endangered species inhabit or migrate through the area just south of the site. Additionally, the PGA area itself supports one of the largest breeding dove colonies in the Southwest and is popular for dove hunting. The RI determined that risk associated with exposure to contaminated ground water is an excess lifetime cancer risk as high as 2×10^{-3}. Although exposure to contamination is currently limited, future migration of contaminants will present heightened risks.

Description of Feasibility Study

The purpose of the FS for the Section 16 Operable Unit was to remove contaminants from the ground-water system and to limit the migration of contaminants from Subunit A of the aquifer to Subunits B and C. The detailed evaluation of alternatives considered CERCLA requirements that a remedial action protect human health and the environment and permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances, pollutants, or contaminants. The remedy selected for the Section 16 Operable Unit should also be consistent with the final remedial action for the entire site. The alternatives considered were grouped into three categories: ground water, water treatment, and water end use.

(1) **Ground-water Alternatives:**

- No action;
- Containment with a slurry wall;
- Extraction at GAC and PGA facilities;
- Extraction from Subunit A beneath all of Section 16; and
- Extraction from Subunit A, at an accelerated rate.

(2) **Treatment Alternatives:**

- Air stripping; and
- Carbon adsorption.

  (All other treatment alternatives were screened out due to performance or institutional constraints and inability to treat expected contaminant concentrations.)

(3) **Water End-Use Alternatives:**

- Ground-water recharge.

  (All other water end-use alternatives were screened out because of the high concentrations of total dissolved salts in Subunit A water.)

Federal applicable or relevant and appropriate requirements (ARARs) for the site included the Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs) and Maximum Contaminant Level Goals (MCLGs).

EPA held a public comment period and a public meeting, and distributed fact sheets concerning the site. During the public comment period on the FS in June and July 1987, EPA received comments from persons residing or conducting business in the area of the site.

Description of Selected Remedy

The entire Subunit A of Section 16 will be pumped and treated with air stripping and reinjected into the aquifer. Water from Subunit B and C will be pumped and treated by the Loral Corporation at historical rates that have contained the contamination within Subunit B and C. Treatment will continue until contaminant levels of the discharge from the treatment plant meet ARARs. Emissions controls, such as activated carbon units, will be used to treat air releases from the treatment facilities, and if the carbon is taken off site, it will be disposed of at an approved Resource Conservation and Recovery Act (RCRA) facility.

The selected remedy satisfies the requirement of reducing the mobility, toxicity, and volume of contaminated water. It also uses a treatment technology to the maximum extent practicable in a cost-effective manner. The remedy meets the operable unit goals of stopping the migration of contaminants, is expected to meet ARARs, and fulfills the preference for permanent solutions at CERCLA sites.

OPERATING INDUSTRIES INC. LANDFILL SITE
SITE CONTROL AND MONITORING (SCM) OPERABLE UNIT
MONTEREY PARK, CALIFORNIA

HRS Score: 57.22 **NPL Rank: 71**

Background

The Operating Industries Inc. (OII) site consists of a 190-acre landfill located approximately 10 miles east of Los Angeles in Monterey Park, California. During its operation from 1948 to 1984, the landfill accepted municipal and industrial waste. Leachate generated at the site contains hazardous organic compounds including vinyl chloride, trichloroethylene, benzene, and toluene. There are approximately 53,000 residences within a 3-mile radius of the site. The site is owned by Operating Industries Inc., the former operators of the landfill. EPA has been conducting site control and monitoring (SCM) activities at the site since May 1986 when OII discontinued all activities at the site.

Hazardous wastes accepted at the landfill included water-insoluble nondecomposable inert solids, waste-water treatment sludge from the production of chrome oxide green pigment, and slop oil emulsion solids and tank bottom sludges (leaded) from petroleum refining operations. Both landfill gas and leachate are generated at the site. Leachate collected by the leachate collection system was historically mixed with solid wastes on site but, since 1985, has been transported by EPA to a permitted off-site treatment facility.

OII was responsible for installation of a leachate collection system, development of an air-dike injection system to control subsurface gas migration, installation of gas extraction wells around the perimeter of the site, and limited site contouring and covering. Emergency actions taken by EPA included slope stability and erosion control improvements, surface runoff and drainage improvements, and site security. In addition, the perimeter of the southern portion of the landfill was fenced, entrance restricted, and 24-hour security provided.

EPA signed two RODs for continuing site control and monitoring activities as an interim remedy until a long-term solution is developed, and for construction of an on-site leachate treatment plant. Long-term remediation will be addressed in a comprehensive remedial investigation/feasibility study (RI/FS). An additional operable unit FS is currently underway for gas control. EPA is conducting negotiations with the OII potentially responsible party (PRP) steering committee to have the PRPs conduct and finance RD/RA of the leachate treatment plant and daily site control.

Description of Site Work

Although the RI for the site has not been completed, numerous site problems include the following: hazardous leachate seepage and breakthrough on the landfill slopes; subsurface and off-site migration of leachate; high landfill methane levels; vinyl chloride present in ambient air emissions and in subsurface gas on site and off site; underground fires and associated subsidence on site; slope instability and erosion problems; surface runoff; ground-water contamination from leachate and migrating landfill gas; and noxious and offensive odors both on site and off site.

Description of Site Control and Monitoring Feasibility Study

Seven control systems require operation and maintenance (O&M), inspection, and monitoring activities, as addressed in the SCM operable unit: (1) the gas extraction and air dike system; (2) leachate collection system; (3) irrigation system; (4) access road system; (5) storm water drainage system; (6) site security; and (7) slope repair and erosion control. Initial screening narrowed the detailed alternative evaluation to two remedies:

(1) Full-time SCM (Level 1) - continued SCM of the site systems, limited to O&M of the systems currently in place; and

(2) Full-time SCM (Levels 1 and 2) - continued SCM and improvements to the systems.

Level 1 is considered a baseline level consisting of basic repairs, and Level 2 includes preventative maintenance.

Community involvement at the site included formation of a committee of residents who live near the landfill. Additionally, EPA conducted community interviews, established information repositories, distributed fact sheets, and held public meetings to keep the community on-site activities and to discuss the SCM and leachate management FSs.

Description of Selected Remedy

EPA recommended Alternative 2 for site control monitoring: full-time SCM (Levels 1 and 2). This alternative is more protective of public health and the environment than Alternative 1 because it allows for system improvements, is protective of human health and the environment, cost-effective, and uses permanent solutions and treatment technologies to the maximum extent practicable. The recommended alternative is not expected to achieve ARARs for gas emissions but, because it is an interim remedy, this requirement can be waived under CERCLA section 121(d).

SAN FERNANDO VALLEY AREA 1 SITE
NORTH HOLLYWOOD/BURBANK WELL FIELD OPERABLE UNIT
LOS ANGELES COUNTY, CALIFORNIA

HRS Score: 42.24 **NPL Rank: 343**

Background

The North Hollywood/Burbank Well Field is located in the San Fernando Valley Area 1 site, one of four NPL sites in the 112,000-acre San Fernando Valley ground-water basin. The ground-water basin is situated in the coastal mountain ranges within the Los Angeles Metropolitan area. The Los Angeles Department of Water and Power (DWP) operates the well field, which provides approximately 10 percent of DWP's total water supply to the residents of the City of Los Angeles. Ground water from the basin can supply water to as many as one million people and is also an important source of water for the nearby cities of Burbank, Glendale, and San Fernando. Three other well field sites in the basin (known as San Fernando Areas 2,3, and 4) have also been included on the NPL.

Investigation of contamination in the Area 1 well field began in 1980 with the discovery of trichloroethylene (TCE) and tetrachloroethylene (i.e., perchloroethylene or PCE) in one-quarter of DWP's wells in the basin. In July 1981, DWP and the Southern California Association of Governments (SCAG) began a 2-year study funded by EPA. The study revealed that contamination was spreading with the flow of ground water at a rate of nearly 300 feet per year. Consequently, DWP began a program that involved pumping and dilution of the contaminated water to control the spread of contamination. In 1984, the entire Area 1 site, along with the three other well field sites in the San Fernando Valley basin, were proposed for inclusion on the NPL.

In 1985, EPA evaluated site data and concluded that adequate information existed to justify a Fast-Track evaluation of the North Hollywood/Burbank Well Field. In March 1986, under a cooperative agreement with EPA, DWP prepared an Operable Unit Feasibility Study (OUFS) to recommend an interim remedy for mitigating ground-water migration in Area 1. The ROD for the well field operable unit was signed August 31, 1987. A comprehensive remedial investigation/feasibility study (RI/FS) of the entire San Fernando Valley area is being completed to select a final remedy for all four sites.

EPA developed a list of 59 potentially responsible parties (PRPs) for the four sites within the San Fernando Valley. The PRP facilities included electroplating, aircraft, and light manufacturing industries. EPA plans to send CERCLA section 104 information-gathering letters to these facilities to determine the extent of their responsibility.

Description of Site Work

Because the OUFS for the Area 1 well field was completed prior to the comprehensive RI/FS, the extent of contamination was based on preliminary investigations. The RI for all four San Fernando Valley sites began in August 1987. According to the investigations, TCE is the primary contaminant, with lesser quantities of PCE and other volatile organic compounds present in the ground water. The highest TCE level found (1500 ppb) is 300 times the Federal standard for the contaminant (5 ppb).

Presently, water from the 27 wells in the North Hollywood Well Field contain TCE in levels greater than Federal and State standards and, at the current rate of migration, water from another 5 to 10 wells may exceed contaminant levels in the next 2 years. Under normal conditions, ground water delivered to DWP customers does contain TCE and PCE, but at levels that do not exceed Federal and State standards. During periods of drought and high demand, however, DWP may be forced to provide water that exceeds standards.

Description of Feasibility Study

The objective of the operable unit FS was to identify actions to slow down or arrest the migration of the contaminant plume at the North Hollywood/Burbank Well Field. The selected alternative was to be used as an interim measure while the comprehensive RI/FS is performed. After an initial screening of technologies and alternatives based on cost and effectiveness in meeting operable unit goals, three alternatives were retained for detailed evaluation:

(1) Ground-water extraction and treatment by aeration;

(2) Ground-water extraction and treatment by granular activated carbon (GAC); and

(3) Ground-water extraction and treatment by aeration combined with vapor-phase GAC.

In December 1986, EPA and DWP held a community meeting on the OUFS report with approximately 15 residents in attendance.

Federal ARARs identified for the site included the Safe Drinking Water Act (SDWA) Maximum Contaminant Level Goals (MCLGs) and Maximum Contaminant Levels (MCLs). The MCLs for TCE and PCE were determined to be applicable to the remedial action. State ARARs included California State Action Levels, which generally parallel EPA's MCLs and MCLGs. Resource Conservation and Recovery Act (RCRA) standards for disposal of spent carbon will be considered an ARAR. Alternatives will comply with State air-quality standards set by the South Coast Air Quality Management District in Los Angeles.

Description of Selected Remedy

EPA determined that the most cost-effective interim remedy is ground-water extraction and treatment by aeration, combined with vapor-phase carbon adsorption (Alternative 3). Although all three alternatives were considered capable of meeting ARARs and CERCLA requirements that a remedy protect human health and be technically implementable, public concern over air emissions caused EPA to select aeration with carbon adsorption as a remedy. The aeration facility will be constructed by the DWP under a cooperative agreement with EPA.

SAN GABRIEL AREA 1 SITE
INITIAL REMEDIAL MEASURES
EL MONTE, CALIFORNIA

HRS Score: 42.24 **NPL Rank: 341**

Background

The San Gabriel Area 1 site is one of four sites (Areas 1 through 4) located in the San Gabriel ground-water basin in Los Angeles County, California. All four sites were found to have contaminated ground water with chlorinated hydrocarbons. Area 1 contains a plume of ground-water contamination located primarily underneath the City of El Monte.

In 1980, the State of California began an extensive well-water testing program in the San Gabriel basin. Results indicated that numerous wells were contaminated with trichloroethylene (TCE), tetrachloroethylene (i.e., perchloroethylene or PCE), and other chlorinated hydrocarbons. Although many water companies have been affected by the contaminated water, only three small water companies in the City of El Monte have been unable to provide water that meets Federal and State drinking-water standards. The larger water companies affected by the contamination have taken interim actions, such as shutting down the contaminated wells or blending water, to reduce contaminant concentrations. The three water companies, Richwood, Rurban Homes, and Hemlock, have no alternate water supplies.

A Focused Feasibility Study (FFS) that was completed in December 1983 identified an initial remedial measure (IRM) to resolve the water companies' contamination problem before a long-term solution to ground-water contamination in the San Gabriel basin is implemented. The objective of the IRM was to ensure that all residents affected by ground-water contamination in San Gabriel Area 1 are provided with safe drinking water. A ROD signed in May 1984 selected air-stripping treatment as the most cost-effective IRM for the three companies. During a Pre-Design Study initiated in July 1984, however, it became apparent that the cost to construct the remedy would be much higher than estimated in the FFS. Consequently, the conceptual design and costs for the next most cost-effective alternative, carbon adsorption treatment, were revised.

In October of 1985, the California State Assembly passed Senate Bill 1063 authorizing State funding for treatment systems and directing the California Department of Health Services (DHS) to pay for the carbon adsorption systems for 20 years. The bill allowed EPA to reconsider its decision regarding the feasibility of the carbon adsorption alternative due to its high operation and maintenance (O&M) cost.

DHS used State funds to construct an emergency connection from Richwood to the San Gabriel Valley Water Company in early 1986. Conceptual designs and cost estimates for carbon adsorption systems were completed, and cost estimates for the air-stripping alternative were updated in June 1986. Given the new cost estimates, EPA determined that carbon adsorption was the most cost-effective alternative. The ROD for the IRM at Area 1 was signed September 30, 1987. An overall area-wide remedial investigation/feasibility study (RI/FS) for the San Gabriel Area (Sites 1 through 4) is being conducted.

Description of Site Work

Sampling studies in Area 1 indicated that the contaminant level of PCE in the Richwood Mutual Water Company North Well was approximately 25 times State action levels and, since that time, Richwood's wells have been shut down. The Rurban Homes Mutual Water Company's wells showed PCE concentrations just above DHS action levels in January 1985. Monthly sampling in 1987, however, has since detected PCE levels below action levels; the reason for this drop is unknown. Sampling data for 1987 shows PCE levels in Hemlock's two wells ranging from less than 10 ppb to as high as 150 ppb, far above the recommended limit of 1 ppb.

Description of Feasibility Study

The IRM alternatives presented in the 1984 ROD were:

(1) Treatment of well discharge with air-stripping system;

(2) Dissolution of water companies and merger with another water company;

(3) Provision of bottled water;

(4) Connection to metropolitan water district; and

(5) Treatment of well discharge with carbon adsorption.

Further evaluation of the alternatives and the development of more refined estimates of water use, has led to cost-estimates different from those initially identified. The non-cost factors associated with each of the IRM alternatives were also reevaluated.

Federal applicable or relevant and appropriate requirements (ARARs) identified for the site include the Safe Drinking Water Act (SDWA) Maximum Contaminant Level Goals (MCLGs) and Maximum Contaminant Levels (MCLs). Also taken into consideration were Health Advisories issued by EPA Office of Drinking Water and DHS action levels. ARARs for the air-stripping alternative included State Air Quality Management Rules and the Clean Water Act (CWA) National Pollution Discharge Elimination System (NPDES). State Air Quality Management Rules were also an ARAR for the carbon adsorption alternative.

A public comment period on the draft report for the IRM was scheduled in October 1986. A fact sheet on the report was distributed and the report was made available at three information repositories. No public meeting was scheduled during the public comment period; however, two comments were received on the selection of alternatives.

Description of Selected Remedy

On the basis of the revised cost-effectiveness analysis, EPA selected carbon adsorption treatment of well discharge from Richwood and Rurban Homes as the IRM alternative (Alternative 5). The remedy, which also includes upgrading Hemlock's current carbon adsorption system, was selected because it is protective of human health and the environment and meets the CERCLA preference for treatment technologies. Under this alternative, the financial impact on the water companies' water users is mitigated through the State's funding of O&M. The alternative presents less potential visual and noise impact on the community than other options and, continued use of the water companies' wells, may contribute to reduced migration of contamination in the ground-water plume.

Due to the recent drop in contamination levels in Rurban Home's wells, the treatment system will not be implemented if continued monitoring shows the contaminant levels remaining below action levels. In addition, in response to a request by Hemlock, its present system will not be upgraded at this time.

STRINGFELLOW ACID PITS
EARLY IMPLEMENTATION ACTION
GLEN AVON, CALIFORNIA

HRS Score: 61.40 **NPL Rank: 32**

Background

The Stringfellow Acid Pits site is a hazardous waste disposal facility in Riverside County, 5 miles northwest of Riverside, California. The Stringfellow Quarry Company operated the facility from August 1956 to November 1972, when it was voluntarily closed. During operations, the company deposited approximately 34 million gallons of industrial wastes, primarily from metal finishing, electroplating and DDT production, in evaporation ponds over 17 acres of the site. Site operations also included spray evaporation of pond contents to accelerate volume reduction. In 1969 and 1978, excessive rainfall caused the disposal ponds to overflow. The overflows extended across a highway into the nearby community of Glen Avon.

In 1980 and 1981, the Santa Ana Regional Water Quality Control Board (RWQCB) implemented an Interim Abatement Program, including removal of liquids, capping, and installation of monitoring wells and a leachate collection system. In 1983, EPA initiated a "Fast Track" remedial investigation/feasibility study (RI/FS) to identify alternatives for ground-water extraction and off-site disposal. The selected interim remedy included the installation of an on-site treatment facility and additional interceptor and monitoring wells. The ROD for the interim remedy was signed July 1984.

The California Department of Health Services (DHS) is conducting a complete RI/FS to identify and evaluate alternatives for final site cleanup. The FS report is expected to be completed by mid-1988. EPA and DHS have identified two early implementation actions (EIAs) to be conducted before the comprehensive RI/FS is completed. The decision on the EIAs was presented in the ROD signed June 25, 1987.

In April 1983, EPA and the State of California filed a civil suit in U.S. District Court against 18 generators of the Stringfellow wastes, four transporters, and nine owners and operators of the disposal facility. EPA has given these potentially responsible parties (PRPs) the opportunity to design and implement the EIAs subject to EPA and DHS approval and oversight, but has not been successful in reaching an agreement with any of them.

Description of Site Work

The 1984 EPA lead RI revealed that ground water beneath the site is heavily contaminated with metals, sulfates, nitrates, fluoride, chloride, and a variety of organics. Ground-water samples also indicated elevated levels of radiation, although no relationship has been found between the Stringfellow wastes and radiation in private community wells. Most recent RI activities indicated a zone of contamination 900 feet wide, extending 2 miles downgradient from the site. Additional ground-water monitoring detected site-related contaminants in a plume moving downgradient from the site into the lower canyon area and the

Glen Avon community, indicating the need for additional actions to increase the effectiveness of the current interim measures.

The primary concern is human exposure to ground water through consumption. If the contaminant plume spreads further into the downgradient regional aquifer, it could contaminate the drinking water supply wells in Glen Avon and surrounding areas as well as those wells used for industrial and agricultural purposes. Another significant exposure potential is through contact with surface water on site and with upgradient water running on the site, especially during large storms. This exposure potential is limited although it can be decreased further by improving surface drainage, especially in the upgradient areas.

Description of Feasibility Study

Based on the initial findings of the RI, the following objectives have been identified for the final remediation process:

- Prevent further plume migration and contamination by isolation and/or treatment of the contaminated soil/water mixture;
- Redirect runoff and run-on to prevent surface-water contamination;
- Prevent site air emissions that may adversely affect public health or the environment; and
- Manage the site area to prevent direct contact.

DHS performed an assessment of 86 potentially applicable technologies. Remaining technologies were compiled into remedial action alternatives, which were screened for compliance with CERCLA requirements and the above objectives. Except for the "no action" alternative, all of the remaining alternatives included the following two actions:

(1) Diversion of upgradient surface waters by means of new peripheral channel; and

(2) Mitigation of the downgradient contaminated plume by installing a ground-water barrier system;

These actions, which should be implemented as soon as possible, were designated as potential EIAs. Also considered as a potential EIA was the following action:

(3) Alternative 2, with treatment of extracted ground water.

DHS identified Clean Water Act (CWA) discharge requirements and Santa Ana Watershed Project Authority (SAWPA) pre-discharge treatment requirements as applicable or relevant and appropriate requirements (ARARs) for the site.

Although no comment was received from the public regarding selection and implementation of the EIAs, the EIAs are consistent with prior remedial actions that the community has supported. Several public meetings have been held during the ongoing RI/FS process.

Description of Selected Remedy

The EIAs selected for the site are Alternatives 1 and 3, which include the following actions:

- Installation of a peripheral channel around the north end of the original site to direct upgradient surface-water runoff; and
- Installation of a ground-water barrier system in the lower canyon area and treatment of extracted ground water, if necessary, with discharge to a publicly-owned treatment works.

In addition, based on the July 1984 ROD, the existing water channels will be extended southward to discharge surface water to Pyrite Creek.

These actions will increase the effectiveness of the existing remedial system and are consistent with both past actions and the final remedial actions to be chosen after completion of the comprehensive RI/FS. These actions have community support, have no significant adverse environmental effects, and will help to protect public health and the environment. The State concurs with the remedy.

COLBERT LANDFILL SITE
COLBERT, WASHINGTON

HRS Score: 41.59 **NPL Rank: 356**

Background

The Colbert Landfill is a 40-acre sanitary landfill located in the town of Colbert approximately 15 miles north-northeast of Spokane, Washington. The area is semi-rural with a population of about 1,500 people within a 3-mile radius of the landfill. Since 1968, the landfill received both municipal and commercial wastes until it was filled to capacity; it is no longer receiving waste. During the years from 1975 to 1980, a local electronics manufacturing company, Key Tronic Corporation, dumped spent organic solvents at the site, mainly methylene chloride (MC) and 1,1,1-trichloroethane (TCA), at an average rate of several hundred gallons a month. During the same period a nearby military facility, Fairchild Air Force Base, also disposed of various solvent wastes at the site. Other parties that disposed spent solvents at the site may be identified.

In 1980, following complaints by nearby residents of chemical disposal in the landfill, the Spokane County Utilities Department initiated an investigation and sampled nearby private wells. Results indicated that some wells were contaminated with TCA. The Phase I study of the Spokane County investigation recommended a ground-water monitoring program, based on a review of existing information on the site and field study. Phase II studies carried out in 1982 involved installation of monitoring wells, injection tests, and ground-water sampling and analysis. In August 1983, EPA placed the Colbert Landfill site on the National Priorities List (NPL). The EPA identified Spokane County, Key Tronic Corporation and Fairchild Air Force Base as potential responsible parties (PRPs).

The remedial investigation/feasibility study (RI/FS), jointly conducted by the Washington Department of Ecology and EPA, was completed in May 1987. The ROD signed September 20, 1987 selected an interim final remedial action for the site, because extraction and interception well-systems will be in operation for decades before remediation is complete, and changes in the selected action may be required during that period.

Description of Site Work

The main contaminants detected in the ground water during the RI were six volatile organic chemicals. The only contaminant of concern detected in any of the soil samples was MC. Detectable levels of "soil gas" contamination were found over much of the area where ground-water contamination had been found. The RI results suggested that substantial quantities of contaminants remain at the bottom of the aquifers in the form of dense, nonaqueous phase liquids, i.e., relatively undiluted chemicals existing as separate liquids rather than in solution in the ground water.

Description of Feasibility Study

Three remedial alternatives were developed and evaluated in the FS:

(1) No action;

(2) Alternate water supply, point of entry treatment, and ground-water extraction; and

(3) Treatment and discharge (using various technologies for each) plus an expanded water system.

Each of these alternatives was considered separately in three geographic portions of the site; the southern area, where the plume in the upper aquifer is advancing; the western area, where the plume in the lower aquifer is the major concern; and the eastern area, where the plumes appear to originate, probably from accumulations of concentrated solvent fluids. About 90 different technologies were screened and evaluated, resulting in detailed evaluation of 12 remedial alternatives in the southern area, seven in the western area, and seven in the eastern area.

The major Federal applicable or relevant and appropriate requirements (ARARS) identified include the following: the Resource Conservation and Recovery Act (RCRA), the Safe Drinking Water Act (SDWA), the Clean Water Act (CWA), and the Clean Air Act (CAA). In addition, the selected remedy has to satisfy numerous Washington State laws and regulations that have been identified. The FS showed that all of the deep-well extraction, treatment, and disposal alternatives are acceptable, as long as performance standards are met.

Description of Selected Remedy

This interim final remedial action addresses management of the migration of contaminants using a ground-water interception system in the southern and western areas, and attempts source control in the eastern area through extraction of ground water with the highest contaminant concentrations. All extracted water will be treated to specified performance standards, monitored to assure compliance, and properly discharged. The remedy is designed:

- to prevent further spread of contaminated ground water in two aquifers by installing and operating interception wells and treating the extracted ground water;
- to remove contaminated materials by installing and operating extraction wells in the area where the plumes originate and treating the effluent; and
- to provide an alternate water supply system to any residents who are deprived of their domestic supply by demonstrated contamination from the landfill or due to the action of the extraction systems.

In order to provide the potentially responsible parties a sufficient degree of latitude in selecting a technology required to achieve the desired performance, the ROD did not specify a particular technology. This desired performance is defined as treating wastewater effluent to or below the Maximum Contaminant Levels (MCLs), or a similar health based level (the 10^{-6} risk level for carcinogens) for contaminants for which MCLs have not been determined. Treated water effluents will also be monitored to assure adherence to performance standards. Treated water discharge shall at all times be consistent with Federal and Washington State laws.

The selected alternative meets CERCLA requirements because it permanently reduces the toxicity, mobility, or volume of the contaminants. The selected alternative also is expected to meet ARARs, is cost-effective, and uses permanent remedies and treatment to the maximum extent practicable.

APPENDIX D

STATUS OF ACTIVE REMEDIAL INVESTIGATIONS/FEASIBILITY STUDIES AND REMEDIAL ACTIONS IN PROGRESS ON SEPTEMBER 30, 1987

Columns 1-4 are self explanatory.

Column 5: **Lead** - The entity leading the project, i.e., Federal lead by the EPA remedial program and Fund-financed (F); lead by the EPA enforcement program (FE); Federal facility lead (FF); State lead and Fund-financed (S); State enforcement lead (may include Federal financing) (SE); joint Federal-State lead, joint State-PRP lead, or other combination (JT); potentially responsible party lead and financed (PRP).

Column 6: **Actual Start** - The actual date on which the listed activity began.

Column 7: **1/1/87 Estimated Completion** - The estimated year and quarter of completion as of January 1, 1987, unless otherwise indicated. Completion dates followed by "j" and "a" were estimated in June and August 1987, respectively. EPA acknowledges that using the January 1, 1987 reference date may not account for all the time gained or lost in the life cycle of a given project. However, EPA chose the January date because it marked the first complete update for RI/FS and RA projects after the hiatus between Superfund authorizations. Choosing an earlier date would have included time lost due to circumstances beyond EPA's control.

Column 8: **9/30/87 Estimated Completion** - The estimated year and quarter of completion as of September 30, 1987, the end of the fiscal year.

Column 9: **Status** - Status of the activity as of the end of FY87. On-schedule activities are designated by an equal sign (=). Activities behind schedule are designated by a numeral indicating the number of quarters the activity is behind schedule and a minus sign (e.g., 2-); activities ahead of schedule by a numeral and a plus sign (e.g., 2+). For example, at the end of the fiscal year, the RA at the Kellogg-Deering Well Field site in Norwalk, Connecticut, was 6 quarters (6+) ahead of its originally scheduled first quarter 1990 completion date. An asterisk in the comment column indicates an activity for which no estimate was made prior to the estimate at the end of the fiscal year.

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
1.	01	CT	Kellogg-Deering Well Field (Norwalk)	RA RIFS	PRP F	09/03/87 06/19/87	90/1 88/2	88/3 89/2	6+ 4-
2.	01	CT	Laurel Park, Inc. (Naugatuck Borough)	RIFS	PRP	05/17/85	87/4	88/2	2-
3.	01	CT	Solvents Recovery Service (Southington)	RA RA	PRP PRP	01/07/86 10/29/86	88/1 88/1	89/4 89/1	7- 4-
4.	01	CT	Yaworski Waste Lagoon (Canterbury)	RIFS	F	03/30/84	87/4	88/2	2-
5.	01	MA	Baird and McGuire (Holbrook)	RIFS RIFS	F F	09/14/87 05/21/87	89/2	89/2 89/2	= *
6.	01	MA	Cannon Engineering Corporation (CE) (Bridgewater)	RIFS	F	08/18/83	88/1	88/2	1-
7.	01	MA	Charles George Reclamation Landfill (Tyngsborough)	RA RA RIFS RIFS	F F F F	08/21/84 08/19/87 06/05/85 01/22/87	88/3 90/3 88/1 88/2	88/4 90/3 88/3 88/3	1- = 2- 1-
8.	01	MA	Groveland Wells (Groveland)	RIFS FS	F F	08/18/83 05/21/87	88/1 88/3j	89/4 88/3	7- =
9.	01	MA	Iron Horse Park (Billerica)	RIFS RIFS	F F	09/28/84 09/26/86	88/1 88/1	88/2 89/2	1- 5-
10.	01	MA	New Bedford Site (New Bedford)	FS RIFS	F F	08/18/83 05/21/86	89/2a 88/2	89/2 89/2	= 4-
11.	01	MA	Norwood PCBs (Norwood)	RIFS	FE	05/21/87	89/4	89/2	2+
12.	01	MA	Nyanza Chemical Waste Dump (Ashland)	RIFS RIFS	F F	05/21/87 05/21/87	89/3 90/3	89/3 89/3	= 4+
13.	01	MA	Plymouth Harbor/Cannon Engineering (Plymouth)	RA RIFS	F F	05/30/86 09/04/87	87/4 88/1	88/1 88/3	1- 2-
14.	01	MA	PSC Resources (Palmer)	RIFS	S	09/30/87	89/3	89/3	=

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[1] Completion dates followed by "j" or "a" were estimated in June and August 1987, respectively.

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87 (continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
15.	01	MA	Rose Disposal Pit (Lanesboro)	RIFS	PRP	12/05/84	88/1	88/3	2-
16.	01	MA	Salem Acres (Salem)	RIFS	PRP	06/15/87	89/1	89/2	1-
17.	01	MA	Silresim Chemical Corporation (Lowell)	RIFS	PRP	06/30/85	89/1	0/0	*
18.	01	MA	Sullivan's Ledge (New Bedford)	RIFS	F	08/16/85	88/2	89/1	3-
19.	01	MA	Wells G&H (Woburn)	RIFS	FE	03/20/87	88/3a	89/1	2-
20.	01	ME	O'Connor Company (Augusta)	RIFS	PRP	05/13/86	89/2	89/2	=
21.	01	ME	Pinette's Salvage Yard (Washburn)	RIFS	F	12/31/84	88/3	89/2	3-
22.	01	ME	Saco Tannery Waste Pits (Saco)	RIFS	F	09/23/87		88/3	*
23.	01	ME	Union Chemical Company (South Hope)	RIFS	PRP	09/15/87		90/4	*
24.	01	ME	Winthrop Township Landfill (Winthrop)	RA	PRP	11/19/86	92/3	92/3	=
25.	01	NH	Auburn Road Landfill (Londonderry)	RA RIFS	PRP F	04/15/87 03/30/84	89/1 88/2	88/4 89/1	1+ 3-
26.	01	NH	Coakley Landfill (North Hampton)	RIFS	S	08/12/85	88/3	88/4	1-
27.	01	NH	Dover Municipal Landfill (Dover)	RIFS	S	03/30/84	88/4	89/1	1-
28.	01	NH	Keefe Environmental Services (Epping)	RIFS	S	09/28/84	88/2	88/3	1-
29.	01	NH	Savage Municipal Water Supply (Milford)	RIFS	PRP	08/10/87		90/1	*
30.	01	NH	Somersworth Sanitary Landfill (Somersworth)	RIFS	S	03/30/84	88/4	89/1	1-
31.	01	NH	South Municipal Water Supply Well (Peterborough)	RIFS	PRP	07/22/86	89/3	89/2	1+
32.	01	RI	Central Landfill (Johnston)	RIFS	PRP	04/03/87	90/1	90/1	=
33.	01	RI	Landfill and Resource RE (North Smithfield)	RIFS	FE	05/15/86	88/4	89/1	1-

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87
(continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est.[1] Completion	(8) 9/30/87 Est. Completion	(9) Status
34.	01	RI	Peterson-Puritan, Inc (Lincoln/Cumberland)	RIFS	PRP	05/29/87	90/3j	90/3	=
35.	01	RI	Stamina Mills, Inc. (North Smithfield)	RIFS	F	04/26/85	88/1	89/1	4-
36.	01	RI	Western Sand and Gravel (Burrillville)	RA RIFS	F PRP	09/28/87 06/03/87	89/3 89/1	89/1 89/1	2+ =
37.	01	VT	Old Springfield Landfill (Springfield)	RIFS	FE	03/13/84	88/2	88/3	1-
38.	02	NJ	A.O. Polymer (Sparta Township)	RIFS	S	09/27/85	89/1j	89/2	1-
39.	02	NJ	Albert Steel Drum	RIFS	S	09/27/85	88/2	89/1	3-
40.	02	NJ	American Cyanamid Company (Bound Brook)	RIFS	PRP	11/01/82	90/2j	90/1	1+
41.	02	NJ	Asbestos Dump (Millington)	RIFS	PRP	04/04/85	88/1	88/3	2-
42.	02	NJ	Beachwood/Berkley Wells (Berkley Township)	RIFS	S	01/13/84	88/2	88/4	2-
43.	02	NJ	Bog Creek Farm (Howell Township)	RIFS	F	05/16/86	88/2	89/1	3-
44.	02	NJ	Bridgeport Rental & Oil Services (Bridgeport)	RA	F	05/08/86		88/1	*
45.	02	NJ	Burnt Fly Bog (Marlboro Township)	RA RIFS	S S	12/07/83 06/28/85	88/4 88/4	89/1 89/1	1- 1-
46.	02	NJ	Caldwell Trucking (Fairfield)	RIFS	F	04/18/87	88/4	89/1	1-
47.	02	NJ	Chemical Insecticide	RIFS	FE	03/29/85	88/2	89/1	3-
48.	02	NJ	Chemical Leaman Tank Lines, Inc. (Bridgeport)	RIFS	PRP	07/15/85	88/1	88/3	2-
49.	02	NJ	Ciba-Geigy Corporation (Toms River)	RIFS	JT	03/30/84	87/4	88/2	2-
50.	02	NJ	Cinnaminson Ground-Water Contamination (Cinnaminson Township)	RIFS	F	03/29/85	88/1	89/1	4-

Progress Toward Implementing Superfund: Fiscal Year 1987

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87
(continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
51.	02	NJ	Dayco Corporation/L.E. Carpenter Co. (Wharton Borough)	RIFS	S	09/26/86	89/4	89/4	=
52.	02	NJ	De Rewal Chemical Co. (Kingwood Township)	RIFS	FE	06/28/85	88/1	89/1	4-
53.	02	NJ	Delilah Road (Egg Harbor Township)	RIFS	S	03/30/84	88/2	89/1	3-
54.	02	NJ	Denzer and Schafer X-ray Co. (Bayville)	RIFS	S	06/26/87	88/3	89/1	2-
55.	02	NJ	Ellis Property (Evesham Township)	RIFS	S	09/26/84	88/1	88/4	3-
56.	02	NJ	Ewan Property (Shamong Township)	RIFS	F	03/29/85	88/1	89/1	4-
57.	02	NJ	Fort Dix (Landfill) (Pemberton Township)	FS	FF	11/15/86	88/1	88/3	2-
58.	02	NJ	Fried Industries (East Brunswick Township)	RIFS	F	06/28/85	88/3	89/2	3-
59.	02	NJ	Glen Ridge Radium Site (Glen Ridge)	RIFS	F	12/13/84	85/4	88/2	10-
60.	02	NJ	Hercules (Gibbstown)	RIFS	SE	07/02/86	89/4	90/1	1-
61.	02	NJ	Hopkins Farm (Plumstead Township)	RIFS	PRP	11/01/86	89/2a	89/2	=
62.	02	NJ	Imperial Oil/Champion (Morganville)	RIFS	S	09/28/84	89/1j	89/2	1-
63.	02	NJ	Jame Fine Chemical	RIFS	FE	06/29/85		89/1	*
64.	02	NJ	Kin-Buc Landfill (Edison Township)	RIFS	PRP	09/23/83	86/4	88/2	6-
65.	02	NJ	King of Prussia (Winslow Township)	RIFS	PRP	04/17/85	88/1	89/2	5-
66.	02	NJ	Lipari Landfill (Pitman)	RIFS	F	03/07/85	88/1	88/2	1-
67.	02	NJ	Lodi Municipal Well (Lodi)	RIFS	F	06/19/87	89/3	89/1	2+
68.	02	NJ	Lone Pine Landfill (Freehold Township)	RIFS	PRP	09/30/85	88/2	88/4	2-
69.	02	NJ	Metaltec/Aerosystems (Franklin Borough)	RIFS	F	03/26/87	89/2	89/2	=
70.	02	NJ	Monitor Devices/Intercircuits, Inc. (Wall Township)	RIFS	S	06/01/86	88/3	89/1	2-

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87
(continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
71.	02	NJ	Monroe Township Landfill (Monroe Township)	RIFS	PRP	07/15/84	87/4j	89/4	8-
72.	02	NJ	Montclair/W. Orange Radium Sites (Montclair/W. Orange)	RIFS	F	12/13/84		88/2	*
73.	02	NJ	Myers Property (Franklin Township)	RIFS	FE	09/26/85	88/1	89/1	4-
74.	02	NJ	Nascolite Corporation (Millville)	RIFS	F	03/30/84	87/2	89/1	7-
75.	02	NJ	NL Industries (Pedricktown)	RIFS	PRP	04/25/86	89/1	89/1	=
76.	02	NJ	Pepe Field (Boonton)	RIFS	S	09/26/84	88/1	88/4	3-
77.	02	NJ	Pomona Oaks Residential Wells (Galloway Township)	RIFS	F	12/24/86	88/2	89/3	5-
78.	02	NJ	Radiation Technology, Inc. (Rockaway Township)	RIFS	S	07/24/86	89/1a	90/1	4-
79.	02	NJ	Reich Farms (Pleasant Plains)	RIFS	F	09/28/84	88/1	88/3	2-
80.	02	NJ	Ringwood Mines/Landfill (Ringwood Borough)	FS	PRP	06/26/87	87/2	88/3	5-
81.	02	NJ	Rockaway Borough Well Field (Rockaway Township)	RIFS	S	04/22/87	88/4	89/1	1-
82.	02	NJ	Rocky Hill Municipal Well (Rocky Hill Township)	RIFS	S	09/26/84	87/4	89/1	5-
83.	02	NJ	Roebling Steel Company (Florence)	RIFS	F	06/19/84	88/4	89/1	1-
84.	02	NJ	Scientific Chemical Processing (Carlstadt)	RIFS	PRP	09/30/85	89/3j	89/3	=
85.	02	NJ	Swope Oil and Chemical Company (Pennsauken)	RIFS	PRP	08/18/86	89/2	90/1	3-
86.	02	NJ	Tabernacle Drum Dump (Tabernacle Township)	RIFS	F	03/29/85	88/1	88/2	1-

Progress Toward Implementing Superfund: Fiscal Year 1987

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87
(continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
87.	02	NJ	Universal Oil Products (East Rutherford)	RIFS	PRP	05/28/86	89/4	90/1	1-
88.	02	NJ	Upper Deerfield Township Sanitary Landfill (Upper Deerfield Township)	RIFS	F	09/30/87	90/1	90/1	=
89.	02	NJ	U.S. Radium Corporation (Orange)	RIFS	FE	09/28/84	88/1	90/1	8-
90.	02	NJ	Ventron/Velsicol (Wood Ridge Borough)	RIFS	SE	11/01/85		90/4	*
91.	02	NJ	Vineland Chemical Company, Inc. (Vineland)	RIFS	F	05/21/86	88/1	88/4	3-
92.	02	NJ	W.R. Grace and Company (Wayne Township)	RA	PRP	05/15/84	87/4	87/4	=
93.	02	NJ	Woodland Route 72 Dump (Woodland Township)	RIFS	S	08/01/85	88/1	89/1	4-
94.	02	NY	American Thermostat Company (South Cairo)	RIFS	F	07/10/87	90/1	88/1	8+
95.	02	NY	Applied Environmental Services (Glenwood Landing)	RIFS RIFS	SE SE	10/13/87 10/13/87	90/1	90/3 90/3	2- *
96.	02	NY	Batavia Landfill (Batavia)	RIFS	PRP	08/09/84	88/3	89/1	2-
97.	02	NY	BEC Trucking (Town of Vestal)	RIFS	F	09/23/87	90/2a	90/2	=
98.	02	NY	Brewster Well Field (Putnam County)	RA RIFS	F F	09/23/87 03/30/87	88/4 88/1	88/4 88/3	= 2-
99.	02	NY	Byron Barrel and Drum (Byron)	RIFS	FE	07/30/87	90/1	90/2	1-
100.	02	NY	Clothier Disposal (Town of Granby)	RIFS	S	12/22/84	87/3	88/2	3-
101.	02	NY	Colesville Municipal Landfill (Town of Colesville)	RIFS	SE	01/07/87	89/4	89/2	2+
102.	02	NY	Cortese Landfill (Village of Narrowsburg)	RIFS	SE	04/11/85		89/3	*
103.	02	NY	Endicott Village Well Field (Village of Endicott)	RIFS	S	06/26/87	90/1	89/1	4+

Progress Toward Implementing Superfund: Fiscal Year 1987

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87 (continued)

	(1) RG	(2) SI	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
104.	02	NY	Facet Enterprises, Inc. (Elmira)	RIFS	PRP	05/22/86	88/1	89/1	4-
105.	02	NY	Fulton Terminals (Fulton)	RIFS	F	12/28/84	87/3	88/1	2-
106.	02	NY	General Motors (Central Foundry Div.) (Massena)	RIFS	PRP	04/16/85	88/1	89/2	5-
107.	02	NY	Hooker (102nd Street) (Niagara Falls)	RIFS	PRP	06/26/84	88/1	89/1	4-
108.	02	NY	Hooker (Hyde Park) (Niagara Falls)	RA	PRP	08/15/87		88/4	*
109.	02	NY	Hooker (S-Area) (Niagara Falls)	RIFS	PRP	01/10/84	86/4	89/2	10-
				RIFS	PRP	10/10/84		89/3	*
110.	02	NY	Hooker Chemical/Ruco Polymer Corp. (Hicksville)	RIFS	FE	09/23/87	90/2j	90/2	=
111.	02	NY	Hudson River PCB's (Hudson River)	RA	S	09/28/84	88/1	88/4	3-
112.	02	NY	Kentucky Avenue Well Field (Horseheads)	RIFS	F	09/23/87	88/2	89/1	3-
113.	02	NY	Love Canal (Niagara Falls)	RA	S	07/12/82	85/1	85/1	=
				RA	S	03/29/85	88/2	88/2	=
				RA	S	09/03/87	87/3	88/1	2-
				RA	S	06/26/87		88/4	*
				RIFS	S	03/22/84	85/3	88/1	10-
				RIFS	S	09/28/84	88/4	88/2	2+
				RA	S	02/09/87	88/2	88/4	2-
				RA	S	06/26/87	88/4	88/2	2+
114.	02	NY	Ludlow Sand and Gravel (Clayville)	RIFS	SE	08/24/85	88/1	89/1	4-
115.	02	NY	Marathon Battery Corporation (Cold Springs)	RIFS	F	12/31/85	88/1	88/3	2-
				RIFS	F	09/14/87	88/3	88/3	=
116.	02	NY	Niagara County Refuse (Wheatfield)	RIFS	F	09/23/87	88/3	90/1	6-
117.	02	NY	North Sea Municipal Landfill (North Sea)	RIFS	PRP	03/31/87	89/3j	89/3	=
118.	02	NY	Olean Well Field (Olean)	RIFS	FE	09/23/87	90/1	88/4	5+

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87 (continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
119.	02	NY	Pasley Solvents and Chemicals, Inc. (Hempstead)	RIFS	F	07/30/87	89/4	90/1	1-
120.	02	NY	Pollution Abatement Services (Oswego)	RA RA	S S	03/12/82 03/29/85	84/1 88/1	84/1 89/1	= 4-
121.	02	NY	Port Washington Landfill (Port Washington)	RIFS	FE	05/21/86	89/1	89/2	1-
122.	02	NY	Preferred Plating Corporation (Farmingdale)	RIFS	F	07/30/87	89/4	90/1	1-
123.	02	NY	Richardson Hill Road Landfill/Pond (Sidney Center)	RIFS	PRP	07/22/87	88/4	89/3	3-
124.	02	NY	Robintech Inc./National Pipe Co. (Town of Vestal)	RIFS	PRP	10/08/87	89/1j	89/3	2-
125.	02	NY	Sarney Farm (Amenia)	RIFS	FE	06/29/85	88/2	89/1	3-
126.	02	NY	Sinclair Refinery (Wellsville)	RIFS	F	03/31/86	88/1	89/1	4-
127.	02	NY	SMS Instruments, Inc. (Deer Park)	RIFS	F	07/09/87	90/1	89/4	1+
128.	02	NY	Solvent Savers (Lincklaen)	RIFS	FE	7/10/87	90/2	90/2	=
129.	02	NY	Syosset Landfill (Oyster Bay)	RIFS	PRP	07/01/86	90/1j	90/1	=
130.	02	NY	Tronic Plating Company (Farmingdale)	RIFS	FE	07/10/87	90/1	90/1	=
131.	02	NY	Vestal Water Supply Well (Vestal)	RA RIFS	F F	09/30/87 04/24/87	88/4 87/4	88/4 89/1	= 5-
132.	02	NY	York Oil Company (Moira)	RIFS RIFS	S S	09/27/83 05/19/86	87/4 88/3	88/1 88/2	1- 1+
133.	02	PR	Fibers Public Supply Wells (Jobos)	RIFS	PRP	12/31/85	88/4	89/2	2-
134.	02	PR	Frontera Creek (Rio Abajo)	RIFS	PRP	10/03/86	88/2j	89/4	6-
135.	02	PR	GE Wiring Devices (Juana Diaz)	RIFS	PRP	01/16/84	87/3	88/3	4-

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87
(continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
136.	02	PR	Juncos Landfill (Juncos)	RIFS	PRP	10/09/84	88/1	89/2	5-
137.	02	PR	Upjohn Facility (Barceloneta)	RIFS	PRP	06/26/87	87/2	88/1	3-
138.	03	DE	Delaware Sand and Gravel Landfill (New Castle County)	RIFS	S	09/15/83	88/1	88/2	1-
139.	03	DE	Halby Chemical Co. (New Castle)	RIFS	FE	03/06/87	88/4	89/1	1-
140.	03	DE	Wildcat Landfill (Dover)	RIFS	S	10/02/84	88/3	88/3	=
141.	03	MD	Limestone Road (Cumberland)	RIFS	F	03/28/87	88/3	89/1	2-
142.	03	MD	Mid-Atlantic Wood Preservers, Inc. (Harmans)	RIFS	PRP	07/11/86	88/3	88/4	1-
143.	03	MD	Sand, Gravel and Stone (Elkton)	RIFS	PRP	01/16/86	88/2j	88/3	1-
144.	03	MD	Southern Maryland Wood Treating (Hollywood)	RIFS	F	03/28/85	88/1	88/3	2-
145.	03	PA	Aladdin Plating (Scott Township)	RIFS	F	03/20/87	89/4j	89/1	3+
146.	03	PA	Ambler Asbestos Piles (Ambler)	RIFS	FE	05/20/85	89/3	88/3	4+
147.	03	PA	Bally Groundwater Contamination (Bally Borough)	RIFS	PRP	01/28/87	88/4	88/4	=
148.	03	PA	Berks Sand Pit (Longswamp Township)	RIFS	S	02/09/84	88/2	88/4	2-
149.	03	PA	Blosenski Landfill (West Caln Township)	RA	F	03/24/87	88/3	88/2	1+
150.	03	PA	Brown's Battery Breaking (Shoemakersville)	RIFS	PRP	06/30/87	89/2	89/1	1+
151.	03	PA	Butler Mine Tunnel (Pittston)	RIFS	PRP	03/30/87	89/3	89/3	=
152.	03	PA	C&D Recycling (Foster Township)	RIFS	PRP	08/31/87	89/2	89/3	1-
153.	03	PA	Craig Farm Drum (Parker)	RIFS	SR	02/10/87	89/1	89/2	1-

Progress Toward Implementing Superfund: Fiscal Year 1987

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87 (continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
154.	03	PA	Croydon TCE (Croydon)	RIFS	F	03/06/87	89/2	89/2	=
155.	03	PA	CryoChem, Inc. (Worman)	RIFS	F	03/06/87	89/2	89/1	1+
156.	03	PA	Delta Quarries/Stotler Landfill (Antis/Logan Townships)	RIFS	PRP	10/09/87	89/3	89/4	1-
157.	03	PA	Dorney Road Landfill (Upper Macungie Township)	RIFS	S	02/09/84	88/3	88/4	1-
158.	03	PA	Douglassville Disposal (Douglassville)	RIFS RIFS	F F	09/04/87 03/06/87	89/2a 88/3a	89/2 88/3	= =
159.	03	PA	Drake Chemical (Lock Haven)	RA RIFS	F F	06/20/87 03/06/87	88/2 88/2j	89/1 88/4	3- 2-
160.	03	PA	East Mount Zion (Springettsbury Township)	RIFS	S	02/09/84	88/2	89/1	3-
161.	03	PA	Havertown PCP (Haverford)	RIFS	S	02/09/84	88/3	89/1	2-
162.	03	PA	Hebelka Auto Salvage Yard (Weisenberg Township)	RIFS	F	03/06/87	90/2	89/1	5+
163.	03	PA	Henderson Road (Upper Merion Township)	RIFS	PRP	12/04/85	87/4	88/3	3-
164.	03	PA	Hranica Landfill (Buffalo Township)	RIFS	PRP	03/06/87	89/3	89/3	=
165.	03	PA	Hunterstown Road (Straban Township)	RIFS	PRP	03/10/87	89/2	89/2	=
166.	03	PA	Industrial Lane (Williams Township)	RA RIFS	F FE	04/09/87 03/06/87	88/4 88/1	88/2 89/1	2+ 4-
167.	03	PA	Keystone Sanitation Landfill (Union Township)	RIFS	FE	06/30/87	89/2	89/2	=
168.	03	PA	Lackawanna Refuse (Old Forge Borough)	RA	F	06/02/87	89/2	90/1	3-
169.	03	PA	Lansdowne Radiation Site (Lansdowne)	RA	F	03/26/87	87/3	89/1	6-
170.	03	PA	Lindane Dump (Harrison Township)	RIFS	SR	09/29/87	88/1	89/2	5-

Progress Toward Implementing Superfund: Fiscal Year 1987

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87

(continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
171.	03	PA	Middletown Air Field (Middletown)	RIFS	PRP	04/15/85	89/3	88/2	5+
172.	03	PA	M.W. Manufacturing (Valley Township)	RIFS	F	03/06/87	89/1	89/4	3-
173.	03	PA	Osborne Landfill (Grove City)	RIFS	FE	09/29/87	88/1j	89/4	7-
174.	03	PA	Palmerton Zinc Pile (Palmerton)	RIFS RIFS	PRP PRP	09/24/85 09/24/85	88/2j 88/2j	88/3 88/4	1- 2-
175.	03	PA	Paoli Rail Yards (Paoli)	RIFS	PRP	05/27/87	90/3j	89/1	6+
176.	03	PA	Reeser's Landfill (Upper Macungie Township)	RIFS	F	03/06/87	89/1	89/1	=
177.	03	PA	Shriver's Corner (Straban Township)	RIFS	PRP	03/10/87	89/3	89/3	=
178.	03	PA	Taylor Borough Dump (Taylor Borough)	RA	PRP	05/28/87	88/4	88/4	=
179.	03	PA	Tysons Dump (Upper Saucon Township)	RIFS	PRP	05/27/86	87/4j	88/4	4-
180.	03	PA	Voortman Farm (Upper Saucon Township)	RIFS	S	02/09/84	88/3	88/3	=
181.	03	PA	Wade (ABM) (Chester)	RA	F	03/04/87	88/2	88/1	1+
182.	03	PA	Walsh Landfill (Honeybrook Township)	RIFS	S	02/09/84	88/2	88/4	2-
183.	03	PA	Westinghouse Elevator Co. (Gettysburg)	RIFS	PRP	03/10/87	89/3	89/3	=
184.	03	PA	Westline Site (Westline)	RA	F	08/21/87	89/1	88/3	2+
185.	03	PA	Whitmoyer Laboratories (Jackson Township)	RIFS	S	06/26/85	88/4	88/1	3+
186.	03	VA	Atlantic Wood Industries, Inc. (Portsmouth)	RIFS	PRP	07/23/87	89/2	89/2	=
187.	03	VA	Avtex Fibers, Inc. (Front Royal)	RIFS	PRP	08/13/86	88/2	88/3	1-
188.	03	VA	Chisman Creek (York County)	RA FS	PRP PRP	10/15/87 08/15/87	 88/2a	89/2 88/2	* =

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87 (continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
189.	03	VA	Defense General Supply Center (Chesterfield County)	RIFS	FF	02/15/87	88/2	89/2	4-
190.	03	VA	Greenwood Chemical Company (Newtown)	RIFS	F	04/03/87	89/2	89/3	1-
191.	03	VA	L.A. Clarke and Son (Spotsylvania County)	RIFS	F	06/27/85	88/1	88/2	1-
192.	03	VA	Rhinehart Tire Fire Dump (Frederick County)	RIFS	F	04/23/85	88/2	88/3	1-
193.	03	VA	Saunders Supply Co. (Chuckatuck)	RIFS	F	08/05/87	90/3	89/3j	4+
194.	03	VA	U.S. Titanium (Piney River)	RIFS	SE	06/30/86	88/4	89/1	1-
195.	03	WV	Fike Chemical, Inc. (Nitro)	RIFS	FE	07/09/87	89/3	89/3	=
196.	03	WV	Leetown Pesticide (Leetown)	RA	F	04/03/87	88/1	88/1	=
197.	03	WV	Ordnance Works Disposal Area (Morgantown)	RIFS	FE	03/29/85	88/1	88/2	1-
198.	03	WV	West Virginia Ordnance (Point Pleasant)	RIFS	PRP	05/13/85	88/1j	88/2	1-
199.	04	AL	Alabama Army Ammunition Plant (Childersburg)	RIFS	FF	04/01/86	87/3	88/3	4-
200.	04	AL	Anniston Army Depot (Anniston)	RIFS	FF	12/31/86	89/3	89/3	=
201.	04	AL	Ciba-Geigy (McIntosh)	RIFS	PRP	01/02/87	89/2j	89/2	=
202.	04	AL	Interstate Lead Company (I) (Leeds)	RIFS	FE	05/30/86	89/3	89/3	=
203.	04	AL	Perdido Ground-Water Contamination (Perdido)	RIFS	PRP	10/04/85	88/1	88/2	1-
204.	04	AL	Stauffer Chemical (Cold Creek Plant) (Bucks)	RIFS	PRP	01/21/86	88/3	88/3	=
205.	04	AL	Stauffer Chemical (LeMoyne Plant) (Axis)	RIFS	PRP	01/21/86	88/3	88/3	=

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87
(continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
206.	04	FL	American Creosote (Pensacola)	RIFS	F	12/31/85	87/3	88/3	4-
207.	04	FL	Bay Drum	RIFS	F	04/24/87	89/4	90/1	1-
208.	04	FL	Brown Wood Preserving (Live Oak)	RIFS	PRP	04/20/84	87/3	88/1	2-
209.	04	FL	Cabot/Koppers (Gainesville)	RIFS	S	01/12/84	88/1	88/4	3-
210.	04	FL	City Industries, Inc. (Orlando)	RIFS	PRP	06/15/84	89/3a	89/3	=
211.	04	FL	Davie Landfill (Davie)	RIFS	F	03/20/87	88/2	88/2	=
212.	04	FL	Kassauf-Kimerling Battery (Tampa)	RIFS	SE	09/23/86		88/2	*
213.	04	FL	Northwest 58th Street Landfill (Hialeah)	FS	F	05/21/87		88/3	*
214.	04	FL	Peak Oil Company/Bay Drum Co. (Tampa)	RIFS	F	04/24/87	89/2	90/1	3-
215.	04	FL	Pepper Steel and Alloys, Inc. (Medley)	RA	PRP	03/26/87	88/1	88/3	2-
216.	04	FL	Pickettville Road Landfill (Jacksonville)	RIFS	PRP	09/30/84	88/2	88/4	2-
217.	04	FL	Sherwood Medical Industries (Deland)	RIFS	FE	04/30/87	89/3	90/1	2-
218.	04	FL	62nd Street Dump (Tampa)	RIFS	S	04/17/84	87/4	88/4	4-
219.	04	FL	Taylor Road Landfill (Seffner)	RIFS	FE	04/30/87	89/2	90/1	3-
220.	04	FL	Zellwood Ground-Water Contamination (Zellwood)	RIFS	F	03/30/84	87/3	88/1	2-
221.	04	GA	Robins Air Force Base (Houston County)	RIFS	FF	12/31/86	88/4	88/4	=
222.	04	KY	Airco (Calvert City)	RIFS	PRP	11/27/85	88/1	88/3	2-
223.	04	KY	B.F. Goodrich (Calvert City)	RIFS	PRP	11/27/85	88/1	88/3	2-
224.	04	KY	Maxey Flats Nuclear Disposal (Hillsboro)	RIFS	PRP	03/24/87	90/2j	89/2	4+
225.	04	KY	Smith's Farm (Brooks)	RIFS	F	04/03/87	90/2	90/1	1+

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87
(continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
226.	04	MS	Flowood Site (Flowood)	RIFS	PRP	12/24/85	88/2	88/3	1-
227.	04	MS	Newsome Brothers/Old Reichhold (Columbia)	RIFS	FE	04/28/86	88/3	88/4	1-
228.	04	NC	Aberdeen Pesticide Dumps (Aberdeen)	RIFS	F	09/29/87	89/1j	89/1	=
229.	04	NC	Bypass 601 Ground-Water Contamination (Concord)	RIFS	F	04/09/87	89/2	90/1	3-
230.	04	NC	Cape Fear Wood Preserving (Fayetteville)	RIFS	F	04/09/87	89/2	89/1	1+
231.	04	NC	Celanese Corporation (Shelby Fiber Operations) (Shelby)	RIFS	PRP	02/15/86	88/1	88/2	1-
232.	04	NC	Chemtronics, Inc. (Swannanoa)	RIFS	PRP	10/21/85	87/4	88/2	2-
233.	04	NC	Jadco-Hughes Facility (Belmont)	RIFS	PRP	09/30/86	88/2	89/2	4-
234.	04	NC	National Starch & Chemical Corp. (Salisbury)	RIFS	PRP	10/10/86	88/4	88/4	=
235.	04	NC	N.C. State University (Raleigh)	RIFS	FE	04/18/87	88/4	89/1	1-
236.	04	SC	Carolawn, Inc. (Fort Lawn)	RIFS	PRP	07/01/85		88/2	*
237.	04	SC	Independent Nail Company (Beaufort)	RIFS	F	04/24/87	88/4j	88/4	=
238.	04	SC	Kalama Specialty Chemicals (Beaufort)	RIFS	PRP	09/28/87	89/3	89/3	=
239.	04	SC	Sangamo/12-Mile/Hartwell PCB (Pickens)	RIFS	PRP	06/18/87		89/2	*
240.	04	SC	SCRDI Bluff Road (Columbia)	RIFS	F	09/29/87	88/1	88/2	1-
241.	04	SC	Wamchem, Inc. (Burton)	RIFS	PRP	04/15/86	87/4	88/2	2-
242.	04	TN	American Creosote (Jackson)	RIFS	F	10/30/85	88/3	88/3	=
243.	04	TN	Amnicola Dump (Chattanooga)	RIFS	PRP	07/28/87		90/2	*
244.	04	TN	Milan Army Ammunition Plant (Milan)	RIFS	FF	09/22/87	89/3	89/3	=

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87
(continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	RG	ST	Site Name	Activity	Lead	Actual Start	1/1/87 Est. Completion[1]	9/30/87 Est. Completion	Status
245.	05	IL	A&F Materials Reclaiming, Inc. (Greenup)	RIFS	F	06/23/83	84/2a	84/2	=
246.	05	IL	Acme Solvent Reclamation (Morristown)	RIFS	PRP	09/29/86	89/2j	89/2	=
				RIFS	PRP	09/29/36	89/2j	89/2	=
247.	05	IL	Belvidere Municipal Landfill (Belvidere)	RIFS	S	10/01/84	88/1	88/1	=
248.	05	IL	Byron Salvage Yard (Byron)	RIFS	F	12/31/84	88/1	88/3	2-
				RIFS	F	05/13/86	88/1	89/1	4-
249.	05	IL	Cross Brothers Pail (Pembroke Township)	RIFS	S	05/04/83	88/2	89/1	3-
250.	05	IL	Kerr-McGee (Residential) (W. Chicago/DuPage County)	RIFS	FE	11/18/83	88/1	89/1	4-
251.	05	IL	Kerr-McGee (Sewage Treatment) (West Chicago)	RIFS	PRP	11/15/83	88/1	89/1	4-
252.	05	IL	LaSalle Electric Utilities (LaSalle)	RA	S	07/27/87	89/4	90/1	1-
				RIFS	S	04/22/87	88/1j	88/1	=
253.	05	IL	Outboard Marine Corporation (Waukegan)	RIFS	F	09/21/87	88/1j	89/1	4-
254.	05	IL	Pagel's Pit (Rockford)	RIFS	PRP	08/27/86	89/1	89/1	=
255.	05	IL	Petersen Sand and Gravel (Libertyville)	RIFS	S	10/01/84	88/2	89/1	3-
256.	05	IL	Sangamo Dump/Crab Orchard (Carterville)	RIFS	FF	02/15/86	88/3j	88/4	1-
257.	05	IL	Sheffield (U.S. Ecology, Inc.) (Sheffield)	RIFS	PRP	09/30/85	88/2	89/1	3-
258.	05	IL	Velsicol Chemical (ILL) (Marshall)	RIFS	S	09/30/84	88/4	89/1	1-
259.	05	IN	American Chemical Service, Inc. (Griffith)	RIFS	FE	01/02/85	88/4	89/4	4-
260.	05	IN	Columbus Old Municipal Landfill #1 (Columbus)	RIFS	PRP	09/15/87	89/3	90/2	3-
261.	05	IN	Fisher-Calo (LaPorte)	RIFS	FE	09/29/84	88/3	89/1	2-
				RA	PRP	09/29/84		0/0	*

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87 (continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
262.	05	IN	Fort Wayne Reduction Dump (Fort Wayne)	RIFS	F	09/26/85	88/3	89/1	2-
263.	05	IN	International Minerals & Chemicals (Terre Haute)	RIFS	PRP	08/06/86	89/2	88/3	3+
264.	05	IN	Lake Sandy Jo (M&M Landfill) (Gary)	RA	F	09/28/87	89/2j	89/2	=
265.	05	IN	Main Street Well Field (Elkhart)	RIFS	F	09/29/86	89/1j	89/1	=
266.	05	IN	MIDCO I (Gary)	RIFS	PRP	06/19/85	88/1	88/3	2-
267.	05	IN	MIDCO II (Gary)	RIFS	PRP	06/19/85	88/1	88/3	2-
268.	05	IN	Ninth Avenue Dump (Gary)	RIFS	F	08/15/85	88/3	88/4	1-
269.	05	IN	Poer Farm (Hancock County)	RIFS	PRP	07/18/85	88/3	89/1	2-
270.	05	IN	Reilly Tar and Chemical (Indianapolis)	RIFS	PRP	03/31/87	89/1j	89/1	=
271.	05	IN	Seymour Recycling Corporation (Seymour)	RA	PRP	08/17/87	87/4	94/2	26-
272.	05	IN	Tri-State Plating (Columbus)	RIFS	F	07/16/87	90/1	90/1	=
273.	05	IN	Waste, Inc. Landfill (Michigan City)	RIFS	PRP	03/31/87	90/1	89/4	1+
274.	05	IN	Wayne Waste Oil (Columbia City)	RIFS	PRP	08/14/87	89/4j	89/4	=
275.	05	IN	Wedzeb Enterprises, Inc. (Lebanon)	RIFS	FE	05/29/86	88/3	89/1	2-
276.	05	MI	Anderson Development Company (Adrian)	RIFS	PRP	05/23/86	89/2	89/1	1+
277.	05	MI	Auto Ion Chemicals, Inc. (Kalamazoo)	RIFS	PRP	06/18/86	89/2j	89/2	=
278.	05	MI	Berlin and Farro (Swartz Creek)	RIFS	PRP	03/14/86	88/1	89/1	4-
279.	05	MI	Butterworth #2 Landfill (Grand Rapids)	RIFS	PRP	04/22/87	89/1	89/4	3-
280.	05	MI	Cemetery Dump (Rose Center)	RA RIFS	S S	06/19/87 06/13/85	89/4 88/1j	89/2 88/3	2+ 2-
281.	05	MI	Chem Central (Wyoming Township)	RIFS RA	PRP PRP	06/30/87 08/01/84	89/2 86/3	89/4 88/1	2- 6-

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87 (continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
282.	05	MI	Clare Water Supply (Clare)	RIFS	PRP	09/30/85	88/2	89/1	3-
283.	05	MI	Cliff/Dow Dump (Marquette)	RIFS	PRP	09/28/84	88/1	88/2	1-
284.	05	MI	Duell and Gardner Landfill (Dalton Township)	RIFS	S	04/08/87	89/2	90/1	3-
285.	05	MI	Electrovoice (Buchanan)	RIFS	S	09/04/87	89/3	88/1	6+
286.	05	MI	Forest Waste Products (Otisville)	RA RIFS	F F	09/21/87 02/26/86	89/2 88/1	88/3 88/2	3+ 1-
287.	05	MI	G&H Landfill (Utica)	RIFS	S	07/27/83	88/2	89/3	5-
288.	05	MI	Grand Traverse Overall Supply Co. (Greilickville)	RIFS	FE	04/09/87	89/2	89/2	=
289.	05	MI	Hedblum Industries (Oscoda)	RIFS	FE	05/21/86	88/2	89/1	3-
290.	05	MI	Ionia City Landfill (Ionia)	RIFS	PRP	01/29/86	88/2	89/1	3-
291.	05	MI	K&L Avenue Landfill (Oshtemo Township)	RIFS	FE	09/26/84	89/2j	89/2	=
292.	05	MI	Kentwood Landfill (Kentwood)	RIFS	PRP	12/13/85	88/1	88/4	3-
293.	05	MI	Mason County Landfill (Peremarquette Township)	RIFS	FE	09/30/85	89/1	88/4	1+
294.	05	MI	Metamora Landfill (Metamora)	RIFS	S	09/30/86	88/2	88/3	1-
295.	05	MI	Motor Wheel, Inc. (Lansing)	RIFS	PRP	08/07/87		89/4	*
296.	05	MI	North Bronson Industrial Area (Bronson)	RIFS	S	06/24/87	89/2	89/4	2-
297.	05	MI	Northernaire Plating (Cadillac)	RA RIFS	S S	06/23/87 09/26/83	88/3 88/2	88/2 89/1	1+ 3-
298.	05	MI	Ossineke Ground-Water Contamination (Ossineke)	RIFS	S	09/21/87	89/4	90/2	2-
299.	05	MI	Ott/Story/Cordova (Dalton Township)	RIFS	FE	08/18/83	88/1	89/1	4-

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87 (continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
300.	05	MI	Packaging Corporation of America (Filer City)	RIFS	PRP	03/14/85	88/1	88/3	2-
301.	05	MI	Petoskey Municipal Well Field (Petoskey)	RIFS	PRP	06/08/87	90/1	89/4	1+
302.	05	MI	Rasmussen's Dump (Green Oak Township)	RIFS	S	05/30/84	88/1	88/2	1-
303.	05	MI	Shiawassee River (Howell)	RIFS	S	06/19/87	90/1	89/4	1+
304.	05	MI	South Macomb Disposal (Macomb Township)	RIFS	FE	09/24/87	89/3	89/3	=
305.	05	MI	Spiegelburg Landfill (Green Oak Township)	RIFS	S	06/26/87	88/3j	88/2	1+
306.	05	MI	Springfield Township Dump (Davisburg)	RIFS	S	05/30/84	87/2	88/2	4-
307.	05	MI	Sturgis Municipal Well (Sturgis)	RIFS	S	06/24/87	89/3	89/4	1-
308.	05	MI	Tar Lake (Mancelona Township)	RIFS	PRP	01/29/86	88/1	89/1	4-
309.	05	MI	Thermo-Chem, Inc. (Mukegon)	RIFS	F	09/21/87	89/4	89/4	=
310.	05	MI	U.S. Aviex (Howard Township)	RIFS	PRP	08/15/85	88/1	88/3	2-
311.	05	MI	Verona Well Field (Battle Creek)	RA RIFS	S F	09/29/86 03/18/86	88/2 88/1	89/1 89/1	3- 4-
312.	05	MI	Wash King Laundry (Pleasant Plains Township)	RIFS	S	09/10/87	89/4	90/1	1-
313.	05	MN	Adrian Municipal Well Field (Adrian)	RIFS	S	09/30/85	89/1	89/1	=
314.	05	MN	Agate Lake Scrapyard (Fairview Township)	RIFS	SE	09/30/85	88/3	88/3	=
315.	05	MN	Burlington Northern (Brainerd/Baxter)	RA RA RA	PRP PRP PRP	05/15/86 05/15/86 05/15/86	92/1 92/1 92/1	92/1 92/1 92/1	= = =
316.	05	MN	Kummer Sanitary Landfill (Bemidji)	RA RIFS	S S	07/08/85 06/29/87	88/3 88/4	89/1 88/3	2- 1+

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87
(continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
317.	05	MN	LaGrand Sanitary Landfill (LaGrand Township)	RIFS	F	06/30/87	87/4a	89/1	5-
318.	05	MN	Long Prairie Ground-Water Contamination (Long Prairie)	RIFS	S	10/01/84	88/3	88/3	=
319.	05	MN	MacGillis and Gibbs/Bell Lumber (New Brighton)	RIFS	S	09/29/87	88/2	89/1	3-
320.	05	MN	New Brighton/Arden Hills (New Brighton)	RIFS	F	04/24/87	89/1j	89/1	=
				RIFS	S	06/12/87	88/4	89/1	1-
				RA	S	09/30/87	89/1	89/4	3-
				RA	FF	09/25/87		88/4	*
				RIFS	FF	08/12/87		88/3	*
				RIFS	FF	08/12/87		89/2	*
321.	05	MN	NL Industries/Taracorp/Golden (St. Louis Park)	RIFS	PRP	01/22/85	87/3	88/3	4-
322.	05	MN	Oak Grove Sanitary Landfill (Oak Grove Township)	RIFS	S	06/13/85	88/3	88/3	=
323.	05	MN	Reilly Tar and Chemical (St. Louis Park)	RA	PRP	09/30/87		88/2	*
				RIFS	PRP	09/04/86	89/3a	89/3	=
				RIFS	PRP	09/04/86		89/3	*
324.	05	MN	Ritari Post and Pole (Sebeka)	RIFS	S	06/30/87	89/3j	89/3	=
325.	05	MN	South Andover Site (Andover)	RIFS	F	09/29/84	88/1	88/2	1-
326.	05	MN	St. Louis River Site (St. Louis County)	RIFS	S	09/30/85	88/4	89/1	1-
327.	05	MN	Union Scrap Iron and Metal (Minneapolis)	RIFS	S	03/30/87	89/4	89/4	=
328.	05	MN	Waste Disposal Engineering (Andover)	RIFS	PRP	03/08/84	87/3	88/1	2-
329.	05	OH	Allied Chemical and Ironton Coke (Ironton)	RIFS	PRP	06/11/84	87/3	88/4	5-
330.	05	OH	Alsco Anaconda (Gnadenhutten)	RIFS	PRP	01/26/87	89/2	89/3	1-

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87 (continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
331.	05	OH	Big D Campground (Kingsville)	RIFS	FE	05/20/86	88/1	89/2	5-
332.	05	OH	Bowers Landfill (Circleville)	RIFS	PRP	01/15/85	88/2	88/4	2-
333.	05	OH	Buckeye Reclamation (St. Clairsville)	RIFS	PRP	10/31/85	88/2	89/1	3-
334.	05	OH	Coshocton Landfill (Franklin Township)	RIFS	FE	09/23/83	87/4	88/2	2-
335.	05	OH	E.H. Schilling Landfill (Hamilton Township)	RIFS	PRP	03/31/87	89/4	89/3	1+
336.	05	OH	Fultz Landfill (Jackson Township)	RIFS	F	09/24/84	88/4	89/1	1-
337.	05	OH	General Electric (Coshocton)	RIFS	PRP	08/28/87		89/3	*
338.	05	OH	Laskin/Poplar Oil Company (Jefferson)	RIFS	F	07/27/83		88/1	*
339.	05	OH	Miami County Incinerator (Troy)	RIFS	FE	03/30/84	87/4	88/4	4-
340.	05	OH	Old Mill (Rock Creek)	RA	F	09/21/87	89/1	90/3	6-
341.	05	OH	Ormet Corporation (Hannibal)	RIFS	PRP	03/27/87	89/2	89/2	=
342.	05	OH	Powell Road Landfill (Dayton)	RIFS	FE	05/30/86	88/2	89/1	3-
343.	05	OH	Pristine, Inc. (Reading)	RIFS	F	09/05/84	88/1	88/1	=
344.	05	OH	Republic Steel Quarry (Elyria)	RIFS	FE	05/29/86	88/2	89/3	5-
345.	05	OH	Skinner Landfill (West Chester)	RIFS	F	09/26/84	89/1	89/1	=
346.	05	OH	South Point Plant (South Point)	RIFS	PRP	04/21/87	89/1j	89/1	=
347.	05	OH	Summit National (Deerfield Township)	RIFS	F	02/22/84	88/1	88/2	1-
348.	05	OH	United Scrap Lead Company (Troy)	RIFS	F	02/02/85	88/1	88/1	=
349.	05	OH	Van Dale Junkyard (Marietta)	RIFS	PRP	07/24/87	89/3	89/4	1-
350.	05	WI	City Disposal Corporation Landfill (Dunn)	RIFS	PRP	05/22/87	89/3	90/3	4-

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87
(continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
351.	05	WI	Eau Claire Municipal Well Field (Eau Claire)	RIFS	F	11/27/84	88/1	88/2	1-
352.	05	WI	Fadrowski Drum Disposal (Franklin)	RIFS	PRP	05/11/87	89/3	90/2	3-
353.	05	WI	Hagen Farm (Stoughton)	RIFS	PRP	07/27/87	89/4	89/4	=
354.	05	WI	Hunts Disposal Landfill (Caledonia)	RIFS	FE	09/17/87	89/3	89/3	=
355.	05	WI	Janesville Ash Beds (Janesville)	RIFS	PRP	09/30/86	89/4	89/4	=
356.	05	WI	Janesville Old Landfill (Janesville)	RIFS	PRP	09/30/86	87/4	89/4	8-
357.	05	WI	Lemberger Landfill, Inc. (Whitelaw)	RIFS	F	06/26/87	89/3	89/3	=
358.	05	WI	Lemberger Transport and Recycling (Franklin Township)	RIFS	F	06/30/87	89/3	90/1	2-
359.	05	WI	Master Disposal Service Landfill (Brookfield)	RIFS	PRP	06/19/86	90/2	90/2	=
360.	05	WI	Mid-State Disposal Landfill (Cleveland Township)	RIFS	F	12/30/83	88/2	88/3	1-
361.	05	WI	Moss-American (Kerr-McGee Oil Co.) (Milwaukee)	RIFS	FE	09/30/85	88/2	89/1	3-
362.	05	WI	Muskego Sanitary Landfill (Muskego)	RIFS	PRP	08/14/87		89/4	*
363.	05	WI	National Presto Industries, Inc. (Eau Claire)	RIFS	PRP	08/01/86	88/3	89/1	2-
364.	05	WI	Oconomowoc Electroplating Co., Inc. (Ashippin)	RIFS	F	04/24/87	89/2	89/3	1-
365.	05	WI	Schmalz Dump (Harrison)	RA	F	06/30/87	88/1j	88/1	=
366.	05	WI	Sheboygan Harbor and River (Sheboygan)	RIFS	PRP	04/11/86	88/1	89/2	5-

Progress Toward Implementing Superfund: Fiscal Year 1987

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87 (continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
367.	05	WI	Wausau Ground-Water Contamination (Wausau)	RIFS	F	06/26/87	89/1	89/4	3-
368.	06	AR	Arkwood, Inc. (Omaha)	RIFS	PRP	05/15/86	89/1	93/4	19-
369.	06	AR	Cecil Lindsey (Newport)	RA	F	04/23/87	88/4	89/1	1-
370.	06	AR	Gurley Pit (Edmondson)	RIFS	FE	04/07/87	88/3	88/4	1-
371.	06	AR	Industrial Waste Control (Fort Smith)	RIFS	FE	09/23/83	87/4	88/3	3-
372.	06	AR	Midland Products (Ola/Birta)	RIFS	S	03/27/85	88/1	88/2	1-
373.	06	AR	Vertac, Inc. (Jacksonville)	RIFS	FE	09/23/83	87/3	88/4	5-
374.	06	LA	Combustion, Inc. (Denham Springs)	RIFS	PRP	03/27/87	90/1	90/1	=
375.	06	LA	Louisiana Army Ammunition Plant (Doyline)	RIFS	FF	10/20/86	89/3	88/1	6+
376.	06	LA	Old Inger Oil Refinery (Darrow)	RA	S	04/25/86	93/2	94/2	4-
377.	06	LA	Petro-Processors of LA (Scotlandville)	RA	PRP	06/30/87	90/2	90/2	=
378.	06	NM	AT&SF (Clovis)	RIFS	PRP	09/01/83	88/1	88/3	2-
379.	06	NM	Homestake Mining Company (Milan)	RIFS	PRP	06/30/87	89/4a	89/4	=
380.	06	NM	South Valley (Albuquerque)	RIFS RIFS RIFS RIFS	F PRP PRP PRP	04/26/85 09/28/84 09/28/84 08/28/84	88/3 88/1j 88/3j 88/3j	88/4 88/3 88/4 88/4	1- 2- 1- 1-
381.	06	NM	United Nuclear Corporation (Church Rock)	RIFS	FE	09/23/83	88/1	88/4	3-
382.	06	OK	Hardage/Criner (Criner)	RIFS	FE	06/30/87	88/3	88/1	2+
383.	06	OK	Sand Springs Petrochemical Complex (Sand Springs)	RIFS	S	03/27/86	88/3	88/3	=

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87
(continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
384.	06	OK	Tinker AFB (Oklahoma City)	RIFS	FF	01/15/86	89/3	88/1	6+
385.	06	TX	Air Force Plant #4 (General Dynamics) (Fort Worth)	RIFS	FF	01/15/86	89/3	88/3	4+
386.	06	TX	Bailey Waste Disposal (Bridge City)	RIFS	PRP	10/07/87	88/3a	88/3	=
387.	06	TX	Bio-Ecology Systems, Inc. (Grand Prairie)	RA	S	05/12/86	88/1	88/4	3-
388.	06	TX	Brio Refining Co., Inc. (Friendswood)	RIFS	PRP	06/27/85	88/1	88/2	1-
389.	06	TX	Crystal Chemical Company (Houston)	RIFS	PRP	04/28/87	88/1	88/4	3-
390.	06	TX	Dixie Oil Processors	RIFS	PRP	04/23/86	88/1j	88/2	1-
391.	06	TX	French, Ltd. (Crosby)	FS RIFS	PRP F	03/11/87 04/29/82	89/3j 88/2a	89/3 88/2	= =
392.	06	TX	Highlands Acid Pit (Highlands)	RA	S	09/27/82	88/1	88/1	=
393.	06	TX	Koppers Company, Inc. (Texarkana)	RIFS	PRP	03/28/85	88/2	0/0	*
394.	06	TX	Motco, Inc. (LaMarque)	RIFS	PRP	03/17/87	88/1	88/3	2-
395.	06	TX	North Cavalcade Street (Houston)	RIFS	F	12/19/84	88/3	88/3	=
396.	06	TX	Odessa Chromium #1 (Odessa)	RIFS	S	09/26/84	88/1	88/2	1-
397.	06	TX	Odessa Chromium #2 (Andrews Highway) (Odessa)	RIFS	S	09/26/84	88/1	88/2	1-
398.	06	TX	Pesses Chemical Co. (Fort Worth)	RIFS	S	03/21/87	89/2	89/1	1+
399.	06	TX	Petro-Chemical Systems (Turtle Bayou) (Liberty County)	RIFS	S	06/30/87	90/1	90/1	=
400.	06	TX	Sheridan Disposal Services (Hempstead)	RIFS RIFS	PRP PRP	02/03/87 02/03/87	88/3 89/4	89/1 89/4	2- =
401.	06	TX	Sol Lynn/Industrial Transformers (Houston)	RIFS RIFS	S S	09/28/85 09/30/85	88/2 89/1a	88/2 89/1	= =

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87
(continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
402.	06	TX	South Cavalcade Street (Houston)	RIFS	PRP	03/28/85	88/3	0/0	*
403.	06	TX	Texarkana Wood Preserving Co. (Texarkana)	RIFS	S	04/06/87	90/2	90/2	=
404.	06	TX	United Creosoting Company (Conroe)	RIFS RA	S S	06/30/87 04/16/87	 88/2	89/2 88/2	* =
405.	07	IA	Chemplex Company (Clinton/Camanche)	RIFS	PRP	09/08/87	89/4	89/4	=
406.	07	IA	Des Moines TCE (Des Moines)	RA RA	PRP F	06/08/87 09/21/87	87/4 88/4	88/2 89/1	2- 1-
407.	07	IA	Dupont	RIFS	FE	05/21/86	88/3	88/4	1-
408.	07	IA	John Deere (Dubuque)	RIFS	PRP	09/29/86	88/4j	88/4	=
409.	07	IA	Midwest Mfg/North Farm (Kellogg)	RIFS	F	04/24/87	89/2	89/1	1+
410.	07	IA	Red Oak City Landfill (Red Oak)	RIFS	F	04/24/87	89/2	89/2	=
411.	07	IA	Shaw Avenue Dump (Charles City)	RIFS	FE	04/24/87	89/2	88/1	5+
412.	07	IA	Vogel Paint and Wax Co. (Orange City)	RIFS	PRP	08/15/87		89/4	*
413.	07	KS	Arkansas City Dump (Arkansas City)	RIFS	S	05/21/86	88/2	88/4	2-
414.	07	KS	Big River Sand Company (Wichita)	RIFS	F	06/26/85	88/2	88/3	1-
415.	07	KS	Cherokee County (Cherokee County)	RIFS RIFS RIFS	F F F	08/07/84 12/19/86 03/25/87	87/4j 88/2j 88/4	88/1 88/2 89/1	1- = 1-
416.	07	KS	Doepke Disposal (Holliday) (Johnson County)	RIFS	F	06/29/85	87/4	88/1	1-
417.	07	MO	Conservation Chemical Co. (Kansas City)	RA	PRP	08/02/85		90/2	*
418.	07	MO	Findett Corporation (St. Charles)	RIFS	FE	09/29/84	88/1	88/4	3-

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87 (continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
419.	07	MO	Fulbright Landfill (Springfield)	RIFS	FRP	09/29/84		89/2	*
				RIFS	FRP	03/13/86		89/1	*
420.	07	MO	Kem-Pest Laboratories (Cape Girardeau)	RIFS	F	05/05/87	90/2j	90/2	=
421.	07	MO	Minker/Stout/Romaine Creek (Imperial)	FS	F	03/23/84		88/2	*
				RIFS	FRP	11/14/84	83/3	89/1	22-
				RA	FRP	11/14/84		89/1	*
422.	07	MO	North-U Drive Well Contamination (Springfield)	RIFS	S	09/27/85	89/2	90/1	3-
423.	07	MO	Solid State Circuits, Inc. (Republic)	RIFS	SE	09/27/85	88/4a	88/4	=
				RIFS	SE	11/20/86		88/4	*
424.	07	MO	Syntex Facility (Verona)	RIFS	FRP	09/06/87	87/4	88/1	1-
425.	07	MO	Times Beach Site (Times Beach)	RA	F	05/13/87	88/2	88/4	2-
				RIFS	F	09/30/85	85/4	88/1	9-
				RIFS	FRP	11/14/84		0/0	*
				RA	FRP	11/14/84		0/0	*
426.	07	MO	Weldon Spring Quarry (St. Charles County)	RIFS	FF	10/01/86	88/3	90/1	6-
427.	07	MO	Wheeling Disposal Service Co. Landfill (Amazonia)	RIFS	FE	02/04/87	89/4	89/2	2+
428.	07	NE	Hastings Ground-Water Contamination (Hastings)	RIFS	F	03/20/87	89/1	89/1	=
				RIFS	F	09/30/87	88/3j	88/4	1-
				RIFS	FRP	06/15/86	89/1j	89/1	=
				RIFS	F	04/09/86	89/3j	90/3	4-
429.	07	NE	Monroe Auto Equipment (Cozad)	RA	FRP	08/06/86	88/2	88/2	=
430.	07	NE	Utica	RIFS	F	09/30/87		0/0	*
431.	07	NE	Waverly Ground-Water Contamination (Waverly)	RIFS	FE	08/14/85	88/1	89/1	4-
432.	08	CO	Broderick Wood Product (Denver)	RIFS	FRP	12/24/85	87/4	88/2	2-

Progress Toward Implementing Superfund: Fiscal Year 1987

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87
(continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
433.	08	CO	California Gulch (Leadville)	RIFS	FE	12/30/83	87/3	88/2	3-
				RIFS	FE	04/07/87	88/1	89/2	5-
434.	08	CO	Central City - Clear Creek (Idaho Springs)	FS	F	04/09/87	88/1	88/1	=
				FS	F	09/17/86	88/4	88/3	1+
435.	08	CO	Martin Marietta (Denver Aerospace) (Waterton)	RIFS	PRP	06/12/86	89/1	89/1	=
436.	08	CO	Rocky Flats Plant (Golden)	RIFS	FF	07/31/86	88/3	88/3	=
437.	08	CO	Rocky Mountain Arsenal (Adams County)	RIFS	FF	02/15/85	87/2	99/4	50-
				RIFS	FF	02/15/85	99/4j	99/4	=
				RIFS	FE	05/19/86		88/1	*
438.	08	CO	Sand Creek Industrial (Commerce City)	RIFS	FE	09/23/83	88/2	88/4	2-
439.	08	CO	Woodbury Chemical Company (Commerce City)	RA	F	03/26/87	88/4	89/1	1-
440.	08	MT	Anaconda Company Smelter (Anaconda)	RIFS	PRP	10/22/84	91/1j	91/1	=
				RIFS	PRP	10/22/84	91/1j	91/1	=
				RIFS	PRP	10/22/84	90/4	91/1	1-
				RIFS	PRP	10/22/84	90/4	91/1	1-
				RIFS	PRP	10/22/84	90/4	91/1	1-
				RIFS	PRP	10/22/84	91/1j	91/1	=
				RIFS	PRP	10/22/84	91/1j	91/1	=
				RIFS	PRP	10/22/84	91/1j	91/1	=
				RIFS	PRP	10/22/84	91/1j	91/1	=
				RIFS	PRP	10/22/84	91/1j	91/1	=
				RIFS	PRP	10/22/84	91/1j	91/1	=
				RIFS	PRP	10/22/84	91/1j	91/1	=
				RIFS	PRP	07/01/86	87/4a	88/1	1-
441.	08	MT	Burlington Northern (Somers)	RIFS	PRP	10/09/85	88/4	89/1	1-
442.	08	MT	East Helena Site (East Helena)	FS	PRP	06/23/87	89/1a	89/1	=
444.	08	MT	Silver Bow Creek/Butte Area (Silver Bow/Deer Lodge)	RIFS	S	09/29/83		90/3	*
445.	08	ND	Arsenic Trioxide Site (Southeastern ND)	RIFS	S	04/29/87	88/1a	88/1	=

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87 (continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
446.	08	SD	Whitewood Creek Mine (Whitewood)	FS	PRP	10/01/83		89/1	*
447.	08	UT	Hill Air Force Base (Ogden)	RIFS	FF	02/14/86	90/4	90/4	=
448.	08	UT	Monticello Radioactive Contaminated Properties (Monticello)	RIFS	PRP	07/19/85		90/1	*
449.	08	UT	Ogden Defense Depot (Ogden)	RIFS	FF	06/30/86	89/1j	89/1	=
450.	08	UT	Olsen/Neihart Reservoir (Wasatch County)	RIFS	S	12/31/84	88/1	89/1	4-
451.	08	UT	Sharon Steel (Midvale Tailings) (Midvale)	RIFS	FE	12/31/84	90/1j	89/1	4+
452.	08	UT	Wasatch Chemical Co. (Salt Lake City)	RIFS	FE	09/30/87	90/1j	90/1	=
453.	08	WY	Baxter/Union Pacific Tie Treating (Laramie)	RIFS	PRP	10/01/86	88/1j	89/4	7-
454.	09	AZ	Indian Bend Wash Area (Scottsdale/Temple/Phoenix)	RIFS	FE	02/22/84	89/2	89/4	2-
455.	09	AZ	Litchfield Airport Area (Goodyear/Avondale)	RIFS RIFS RIFS	FE PRP PRP	09/23/83 03/05/85 03/19/85	88/2	89/2 88/4 88/4	4- * *
456.	09	AZ	Mesa Area Ground-Water Contamination (Mesa)	RIFS	SE	05/01/87		89/1	*
457.	09	AZ	Motorola, Inc. (52nd Street) (Phoenix)	RIFS	SE	09/28/84	87/2	88/2	4-
458.	09	AZ	19th Avenue Landfill (Phoenix)	RIFS	SE	07/25/86	88/2	88/3	1-
459.	09	AZ	Tucson International Airport Area (Tucson)	RIFS	S	06/09/83	87/4	88/2	2-
460.	09	CA	Advanced Micro Devices (Sunnyvale)	RIFS	SE	01/02/82	88/1	88/2	1-
461.	09	CA	Atlas Asbestos Mine (Fresno County)	RIFS	F	09/21/84	88/1	89/1	4-
462.	09	CA	Beckman Instruments (Porterville)	RIFS	PRP	02/20/87	90/1	89/2	3+

Progress Toward Implementing Superfund: Fiscal Year 1987

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87
(continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
463.	09	CA	Castle Air Force Base (Merced)	RIFS	FF	11/15/84	88/1	88/3	2-
464.	09	CA	Celtor Chemical Works (Hoopa)	RA	F	05/21/87	88/2	89/2	4-
465.	09	CA	Coalinga Asbestos Mine (Coalinga)	RIFS	F	09/21/84	88/1	89/1	4-
466.	09	CA	Coast Wood Preserving (Ukiah)	RIFS	SE	05/01/84	88/1	88/3	2-
467.	09	CA	Fairchild Camera (Mountain View)	RIFS	PRP	08/15/85	88/1	88/4	3-
468.	09	CA	Fairchild Camera (South San Jose)	RIFS	SE	04/10/82	88/2	88/2	=
469.	09	CA	Firestone Tire and Rubber (Salinas)	RIFS	SE	10/16/85	88/4	90/1	5-
470.	09	CA	FMC Corporation (Fresno)	RIFS	PRP	02/05/87	88/4	90/1	5-
471.	09	CA	Hewlett Packard (Palo Alto)	RIFS	SE	04/01/83	87/3	88/4	5-
472.	09	CA	Intel Corporation (Mountain View)	RIFS	PRP	08/15/85	88/2j	88/4	2-
473.	09	CA	Intel Corporation (Santa Clara)	RIFS	SE	06/01/82	87/3	89/1	6-
474.	09	CA	Intel Magnetics (Santa Clara)	RIFS	SE	06/01/82	88/1	89/1	4-
475.	09	CA	Iron Mountain Mine (Redding)	RIFS	F	03/28/87	89/3	89/3	=
476.	09	CA	J.H. Baxter Company (Weed)	RIFS	FE	03/14/87	89/4	89/4	=
477.	09	CA	Koppers Company Inc. (Oroville)	RIFS	PRP	04/25/86	88/2	89/1	3-
478.	09	CA	Lawrence Livermore National Lab (Livermore)	RIFS	FF	03/25/87	88/1	91/3	14-
479.	09	CA	Liquid Gold Oil Corporation (Richmond)	RIFS	SE	09/20/83	88/1	88/4	3-
480.	09	CA	Louisiana-Pacific Corporation (Oroville)	RIFS	FE	03/31/87	89/3	90/1	2-
481.	09	CA	Marley Cooling Tower Company (Stockton)	RIFS	SE	02/01/85	90/1j	90/1	=
482.	09	CA	Mather AFB (AC&W Disposal) (Sacramento)	RIFS	FF	03/01/83	92/2a	92/2	=

Progress Toward Implementing Superfund: Fiscal Year 1987

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87
(continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
483.	09	CA	McClellan AFB (Ground-Water Contamination) (Sacramento)	RIFS	FF	06/01/83	90/1j	90/1	=
484.	09	CA	McColl (Fullerton)	RA	S	06/11/84	89/1	89/1	=
				RIFS	F	08/07/85	88/3	89/2	3-
485.	09	CA	MGM Brakes (Cloverdale)	RIFS	FE	12/08/86	88/1a	88/3	2-
486.	09	CA	Moffett Naval Air Station (Sunnyvale)	RIFS	FF	08/01/85		90/1	*
487.	09	CA	Monolithic Memories Inc. (Sunnyvale)	RIFS	SE	05/01/82	88/1	89/1	4-
488.	09	CA	Montrose Chemical Corporation (Torrance)	RIFS	PRP	10/10/86	89/2j	89/2	=
489.	09	CA	National Semiconductor Corporation (Santa Clara)	RIFS	SE	02/01/82	88/2	89/1	3-
490.	09	CA	Norton Air Force Base (San Bernardino)	RIFS	FF	10/01/86	88/2j	89/4	6-
491.	09	CA	Operating Industries, Inc. Landfill (Monterey Park)	FS	FE	04/07/87		89/2	*
				FS	FE	03/19/85	87/3j	88/1	2-
				FS	FE	09/22/87	88/1j	88/3	2-
				RA	F	02/04/87	90/1j	90/1	=
492.	09	CA	Purity Oil Sales, Inc. (Malaga)	RIFS	F	12/31/85	88/3	88/4	1-
493.	09	CA	Raytheon Corporation (Mountain View)	RIFS	PRP	08/15/85	88/2j	88/4	2-
494.	09	CA	Rhone-Poulenc/Zoecon Corp. (East Palo Alto)	RIFS	SE	10/15/87	89/1j	90/1	4-
496.	09	CA	San Fernando Valley (Area 4) (Los Angeles)	RIFS	S	08/16/85	87/2	89/2	8-
				RA	S	08/06/87	88/1j	89/1	4-
497.	09	CA	San Fernando Valley (Area 4) (Los Angeles)	RIFS	S	08/16/85	88/4	89/2	2-
498.	09	CA	San Gabriel Valley (Area 3) (Alhambra)	RIFS	S	09/30/85	92/4	92/4	=
				RIFS	F	03/22/84	90/4	92/4	8-
				RIFS	F	03/28/87	90/4j	89/3	5+
				RA	F	06/13/84	88/3a	88/4	1-

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87 (continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
499.	09	CA	San Gabriel Valley (Area 2) (Baldwin Park Area)	RIFS RIFS RIFS	F F F	06/13/84 04/01/87 04/15/87	92/4j 89/4 88/3j	92/4 88/4 88/4	= 4+ 1-
500.	09	CA	San Gabriel Valley (Area 3) (Alhambra)	RIFS	F	06/13/84	92/4	92/4	=
501.	09	CA	San Gabriel Valley (Area 4) (LaPuente)	RIFS	F	06/13/84	92/4	92/4	=
502.	09	CA	Selma Treating Company (Selma)	RIFS	FE	03/28/85	88/2j	88/3	1-
503.	09	CA	Sharpe Army Depot (Lathrop)	RIFS	FF	04/01/87	89/4	89/3	1+
504.	09	CA	Signetics, Inc. (Sunnyvale)	RIFS	SE	01/01/82	88/1	88/2	1-
505.	09	CA	South Bay Asbestos Area (Alviso)	RIFS	F	07/11/85	88/2	89/1	3-
506.	09	CA	Stringfellow (Glen Avon Heights)	RIFS RA RA	S S S	08/07/84 09/30/87 08/15/85	88/2j 89/2j 93/1	88/4 89/2 88/1	2- = 20+
507.	09	CA	T.H. Agriculture & Nutrition Co. (Fresno)	RIFS	SE	04/30/87	89/1	89/4	3-
508.	09	CA	Van Waters and Rogers, Inc. (San Jose)	RIFS	SR	12/01/82	88/4	89/2	2-
509.	09	CA	Watkins-Johnson Company (Scotts Valley)	RIFS	PRP	09/22/87	89/2	90/1	3-
510.	09	CA	Westinghouse Electrical (Sunnyvale)	RIFS	SE	10/01/81	88/4	88/4	=
511.	09	GU	Ordot Landfill (Guam)	RIFS	F	03/06/87	89/1	89/1	=
512.	10	ID	Arrcom (Drexler Enterprises) (Rathdrum)	RIFS	F	05/01/87	89/2	89/2	=
513.	10	ID	Bunker Hill Mining and Metallurgy (Smelterville)	RIFS RIFS	SE PRP	01/02/85 05/13/87	88/4 88/4a	89/1 88/4	1- =
514.	10	ID	Pacific Hide and Fur Recycling Co. (Pocatello)	RIFS	PRP	09/29/86	89/2	89/2	=
515.	10	OR	Allied Plating, Inc. (Portland)	RIFS	F	09/24/87	89/4	89/4	=
516.	10	OR	Gould, Inc. (Portland)	RIFS	PRP	08/29/85	88/2	88/4	2-

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON 9/30/87 (continued)

	(1) RG	(2) ST	(3) Site Name	(4) Activity	(5) Lead	(6) Actual Start	(7) 1/1/87 Est. Completion[1]	(8) 9/30/87 Est. Completion	(9) Status
517.	10	OR	Martin Marietta Aluminum Co. (The Dalles)	RIFS	PRP	09/12/85	88/2	88/4	2-
518.	10	OR	Teledyne Wah Chang (Albany)	RIFS	PRP	05/05/87	90/1	90/1	=
519.	10	OR	United Chrome Products, Inc. (Corvallis)	RA	F	09/24/87	88/4	88/4	=
520.	10	WA	Com Bay/Near Shore/Tide Flats (Pierce County)	RIFS	S	07/07/82	87/4	88/3	3-
				RIFS	PRP	09/10/86	89/3	89/3	=
				RIFS	PRP	11/01/84	87/4j	88/1	1-
521.	10	WA	Com Bay/South Tacoma Channel (Tacoma)	RA	F	06/11/87	90/3	88/2	9+
				RIFS	PRP	01/22/87	89/1	89/2	1-
				RIFS	PRP	06/27/86	88/1	88/2	1-
522.	10	WA	FMC Corporation (Yakima)	RIFS	PRP	07/31/87		89/1	*
523.	10	WA	Frontier Hard Chrome, Inc. (Vancouver)	RIFS	S	03/15/84	88/1	88/2	1-
524.	10	WA	Greenacres Landfill (Spokane County)	RIFS	S	12/20/84	89/4	89/4	=
525.	10	WA	Hidden Valley Landfill (Thun Field) (Pierce County)	RIFS	SE	08/27/87	89/4	90/4	4-
526.	10	WA	Lakewood Site (Lakewood)	RA	F	05/15/86	87/3	88/1	2-
				RA	F	09/24/87	89/2	89/2	=
527.	10	WA	Mica Landfill (Mica)	RIFS	F	09/14/87	90/2	90/2	=
528.	10	WA	Northside Landfill (Spokane)	RIFS	S	09/14/87	87/4	88/3	3-
529.	10	WA	Northwest Transformer (Everson)	RIFS	F	09/28/85	88/3	88/3	=
530.	10	WA	Queen City Farms (Maple Valley)	RIFS	FE	09/30/85	89/4	89/4	=
531.	10	WA	Silver Mountain Mine (Loomis)	RIFS	F	09/21/87	89/4	89/4	=
532.	10	WA	Western Processing Company, Inc. (Kent)	RA	PRP	07/06/87		89/1	*
533.	10	WA	Wyckoff Company/Eagle Harbor (Bainbridge Island)	RIFS	F	09/03/87		90/2	*

APPENDIX E

EPA *FEDERAL REGISTER* SUPERFUND DOCUMENTS IN FISCAL 1987

The daily *Federal Register* provides a uniform system for publishing Federal agency documents. During the fiscal year, the EPA Superfund program published 32 documents in the *Federal Register*. These included such things as proposed and final rules, notices of public meetings, and policies with requests for comments. The following table provides the date, citation, and subject for each of those publications for the period October 1, 1986 through September 29, 1987.

Date	**Citation**	**Subject**
1. Dec. 22	51 FR 45767	Reportable Quantity Adjustments. Correction.
2. Jan. 22	52 FR 2492	Amendment to the National Oil and Hazardous Substances Contingency Plan; the National Priorities List (NPL), Update #6. Proposed Rule.
3. Feb. 5	52 FR 3699	Limitations to Superfund Response Claims. Notice of Regulatory Limitations.
4. Feb. 25	52 FR 5578	Uncontrolled Hazardous Waste Sites; Availability of Documents and Information generally available in PAs and SIs. Notice of Availability of Information.
5. Mar. 16	52 FR 8140	Hazardous Substances Reportable Quantity Adjustments. Proposed Rule.
6. Mar. 16	52 FR 8172	Hazardous Substances Reportable Quantity Adjustments. Proposed Rule.
7. Apr. 9	52 FR 11513	Intent to Revise the Hazard Ranking System. Advance Notice of Proposed Rulemaking.
8. Apr. 17	52 FR 12866	Notice of the First Priority List of Hazardous Substances that will be the Subject of Toxicological Profiles.
9. May 13	52 FR 17991	The NPL Listing Policy for Federal Facilities. Proposed Policy.

EPA *FEDERAL REGISTER* SUPERFUND DOCUMENTS IN FISCAL 1987
(continued)

Date		Citation	Authority
10.	May 28	52 FR 19919	Interim Guidelines for Non-Binding Preliminary Allocations of Responsibility (NBAR). Request for Public Comment.
11.	June 5	52 FR 21367	Science Advisory Board, Hazard Ranking System Review Subcommittee; Open Meeting, June 29-30, 1987.
12.	June 8	52 FR 21648	Notice of the First Priority List of Hazardous Substances that will be the Subject of Toxicological Profiles. Correction.
13.	June 10	52 FR 22244	Technical Assistance Grants to Groups at NPL Sites; Advance Notice of Rulemaking and Request for Comments.
14.	June 12	52 FR 22525	Financial Assistance Program for Cooperative Agreements under the Superfund Innovative Technology Evaluation (SITE) Program. Notice of Availability for Review.
15.	June 30	52 FR 24333	Interim Guidance on De Minimis Waste Contributor Settlements. Request for Public Comment.
16.	July 7	52 FR 26160	Science Advisory Board, Hazard Ranking System Review Subcommittee; Open Meeting, July 16-17, 1987.
17.	July 13	52 FR 26160	Withdrawal of Arbitration Procedures and Natural Resource Claims Procedures for the Hazardous Substance Superfund. Proposed Rule.
18.	July 13	52 FR 26181	Science Advisory Board, Hazard Ranking System Review Subcommittee; Open Meeting, July 27-28, 1987.
19.	July 20	52 FR 27257	Draft Updated Health and Hazard Assessments for Trichloroethylene and Dichloromethane. Notice of Availability of External Review Drafts.

EPA *FEDERAL REGISTER* SUPERFUND DOCUMENTS IN FISCAL 1987
(continued)

Date	Citation	Authority
20. July 22	52 FR 27620	NPL for Uncontrolled Hazardous Waste Sites Proposed in Updates #2-6. Final Rule.
21. July 22	52 FR 27643	NPL for Uncontrolled Hazardous Waste Sites; Federal Facility Sites. Proposed Rule.
22. July 27	52 FR 28038	Interim Guidance on Covenants Not to Sue. Request for Public Comment.
23. Aug. 4	52 FR 28867	Science Advisory Board, Hazard Ranking System Review Subcommittee; Open Meeting, August 20-21, 1987.
24. Aug. 4	52 FR 28866	Interim Guidelines for Preparing NBARs. Extension of Public Comment Period.
25. Aug. 5	52 FR 29060	Science Advisory Board, Hazard Ranking System Review Subcommittee; Open Meeting, September 14-15, 1987.
26. Aug. 27	52 FR 32496	Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements. Notice of Guidance.
27. Sept. 2	52 FR 33284	Interim Guidance on *De Minimis* Waste Contributor Settlements. Extension of Public Comment Period.
28. Sept. 3	52 FR 33446	NPL for Uncontrolled Hazardous Waste Sites, Notice of Intent to Delete Sites. Request for Comments.
29. Sept. 8	52 FR 33812	Withdrawal of Arbitration Procedures and Natural Resource Claims Procedures for Hazardous Substance Superfund as proposed on July 13, 1987. Final Rule.
30. Sept. 22	52 FR 35577	Notice of Proposed Settlement under CERCLA; Union Chemical Co., Inc. Cost Recovery at Hazardous Waste Site in South Hope, Maine.

EPA *FEDERAL REGISTER* SUPERFUND DOCUMENTS IN FISCAL 1987 (continued)

Date		Citation	Authority
31.	Sept. 23	52 FR 35767	Notice of Workgroups Convened to Develop State-recommended Guidance for State Capacity Assurance Requirements under CERCLA.
32.	Sept. 29	52 FR 36461	Interim Guidance on Covenants Not to Sue. Extension of Public Comment Period.

APPENDIX F

EPA INSPECTOR GENERAL REPORT UNDER SECTION 301(h)(2)

TABLE OF CONTENTS

Page

SCOPE AND OBJECTIVES 426

SUMMARY OF RESULTS 427

DETAILS OF REVIEW 428

- **Annual Report Chapter 2.0** -- *Responding to Releases of Hazardous Substances* 428
- **Annual Report Chapter 7.0** -- *Development and Evaluation of Permanent Treatment Technologies* 434
- **Annual Report Chapter 13.0** -- *Executive Branch Estimate of Resources Needed to Complete CERCLA Implementation* 434
- **Annual Report Appendix C** -- *Detailed ROD Descriptions* 435
- **Annual Report Preparation Process** 435

EXHIBITS

- **EXHIBIT 1** -- FY87 Activities Annual Report vs. Regional Records 437
- **EXHIBIT 2** -- Review of Regional Records for FY87 439
- **EXHIBIT 3** -- Feasibility Study Write-Up Example 440

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

APR 6 1989

MEMORANDUM

THE INSPECTOR GENERAL

SUBJECT: Audit Report No. E1S4*7-11-0037-9100236
Review of the Fiscal Year 1987
Superfund Report to Congress

John C. Martin

FROM: John C. Martin
Inspector General (A-109)

TO: William K. Reilly
Administrator (A-100)

SCOPE AND OBJECTIVES

This report presents the results of our review of the Environmental Protection Agency's (EPA) Annual Report to Congress on *Progress Toward Implementing Superfund: Fiscal Year 1987* (Annual Report). The objectives of our review were to determine whether the Annual Report is reasonable and accurate, as required by Section 301(h)(2) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

We conducted our review between January 15, 1988, and January 23, 1989, at EPA Headquarters and in EPA Regions 2, 5, 8, and 9. We completed most of our work by August 1988, when EPA sent the Report to the Office of Management and Budget (OMB) for review. However, we also reviewed the final changes made to the Report in January 1989, after OMB's review had been completed.

Our work focused on Fiscal Year 1987 (FY87) activities. Numerous auditors familiar with the Superfund program reviewed the entire Annual Report to determine if there were any sections which did not appear to be reasonable and accurate. We performed detailed audit work in EPA Headquarters and Regions 2, 5, 8, and 9 to verify the accuracy of key information presented in Chapters 2.0, "Responding to Releases of Hazardous Substances", and 7.0, "Development and Evaluation of Permanent Treatment Technologies". These chapters of the Annual Report addressed five of the seven areas specifically required by Section 301(h)(1) of CERCLA. We did not perform detailed audit work on Chapter 13.0, "Executive Branch Estimate of Resources Needed to Complete CERCLA Implementation", another area which CERCLA required, since the Agency provided only current budget figures in response to this requirement. Finally, we reviewed Appendix C, "Detailed ROD Descriptions", to determine if the summaries presented were reasonable.

Throughout the course of our review, we brought the concerns which we identified to the Agency's attention. The Agency corrected most of these concerns.

Except as noted below, our work was performed in accordance with the *Standards for Audit of Government Organizations, Programs, Activities and*

Functions (1981 revision) issued by the Comptroller General of the United States. We did not perform a full scope audit to determine if the Superfund program is achieving the results required by CERCLA, nor did we perform extensive tests to determine if internal controls are adequate. We performed audit work we believed necessary to determine if key information included in the Annual Report is reasonable and accurate. Furthermore, for the items not tested, based on our review, nothing came to our attention which warranted more detailed audit work than that described in the *DETAILS OF REVIEW* section.

SUMMARY OF RESULTS

We found that some of the areas presented in the Annual Report, such as the information presented in Chapter 7.0 on the Superfund Innovative Technology Evaluation (SITE) Program, were generally reasonable and accurate. However, other important areas of the Report included information which was not reasonable and accurate, and some information was not as complete as it could have been. In addition, the process the Agency used to prepare the Annual Report was not completely effective.

Certain information presented in Chapter 2.0 of the Annual Report was not reasonable or accurate. First, program accomplishments figures were frequently inaccurate because the Agency used Headquarters information systems which were not reliable to prepare its Report. Many of their figures did not agree with the corresponding information secured from Regional systems, and significant portions of the Regional claims were not supported by valid source documents. In addition, Appendix D of the Annual Report, which shows the status of Remedial Investigations/Feasibility Studies (RI/FS) and Remedial Actions (RA) on September 30, 1987, identifies delays which occurred since January 1, 1987, but does not identify any delays which may have occurred prior to that date.

The Agency's official definitions of two terms used in the Annual Report, the "start" of key program activities and "operable unit", may lead the reader to believe that more on-site work was done, at a greater number of facilities, than actually occurred. Specifically the Agency defines "start" as a financial transaction, i.e., when funds are obligated to begin work. No actual on-site cleanup work needs to be performed to qualify as a "start", and many months can elapse between the obligation of funds and the commencement of on-site work. In addition, EPA frequently divides Superfund "sites" into "operable units" to more easily manage the cleanup process. One site can have ten or more operable units, creating difficulty in correlating the number of cleanup actions taken during FY87 with overall cleanup progress at Superfund sites.

In two areas of the Annual Report, we believe the information presented was not as complete as it could have been. First, CERCLA requires the Agency to provide an estimate of the resources needed to complete implementation of the statute. In response, however, EPA provided only the Agency's FY87 through FY89 budget figures. Second, we do not believe that the level of detail provided in the feasibility studies descriptions is sufficient, so that the reader can fully understand and appreciate EPA's decision-making process.

Finally, the process used to prepare the Annual Report was not fully effective. For example, the Report coordinator's resources were limited, and key end of fiscal year data was still uncertain and, in some cases, unavailable for our review until April 1988. As a result, the Annual Report was not completed until January 1989, even though it was due to Congress on January 1, 1988.

The details of our scope, methodology, and results of review for the concerns summarized above are presented in the *DETAILS OF REVIEW* section of our report.

DETAILS OF REVIEW

Annual Report Chapter 2.0 -- Responding to Releases of Hazardous Substances

As previously stated, some of the information in the Annual Report was not finalized until January 1989. In order that our review would not delay the Report any further, we began our field work by using a January 1988 draft, and used updated drafts as they became available. We identified the types of information included in the Report, and specifically focused our field work on those items CERCLA required. We then selected four Regions in which to perform our detailed audit work: Regions 2 and 5 because of their heavy volume of Superfund activity; and Regions 8 and 9 because of their significantly lower volume. Recognizing Regional differences, we hoped in this manner to obtain a balanced, nationwide perspective in our review.

We initially planned to select a sample of cases for review from the Headquarters information systems being used to prepare the Annual Report. In early December 1987, we began requesting details on which systems were being used. As of January 15, 1988, when we began our review, the Report coordinator could not tell us all of the systems that would be used to provide input. Therefore, because we did not have a universe of cases from Headquarters records from which to select a sample, we obtained FY87 information directly from the EPA Regions. Regional officials provided this information from a variety of computerized and handwritten systems, and stated that it was the most accurate available.

We first verified the accuracy of the Regional numbers by interviewing Regional staffs and reviewing source documentation. In some cases, we reviewed 100 percent of the actions; however, if the number was prohibitively large, we randomly selected a sample for review. We also selectively reviewed a small number of end of year actions to determine whether there existed instances in which Superfund accomplishments were merely "paper transactions" and no on-site work was actually performed. We did not perform a statistical sample; therefore, the results of our review should not be projected throughout EPA.

Although the Annual Report shows totals by Region for Removal Starts and Removal Completions, it shows only nationwide totals for the other major Superfund activities we reviewed. The Report coordinator provided us with Regional information on these other activities late in our review. Therefore, at the conclusion of our field work, we compared the totals provided by the Regions to those provided by the coordinator. We could not make this comparison earlier because, in most cases, the Report coordinator was unable to provide the Regional details until April 6, 1988.

Although we cannot state conclusively what the correct figures are, it is evident from our work that some of the information presented in this Report chapter is not completely reliable. In virtually every case, the total accomplishments figures included in the Annual Report did not agree with Regional records (see Exhibit 1 at the end of this report). And, as Exhibit 2 shows, 30 percent of removal activities and 13 percent of remedial activities claimed by the Regions were not supported by valid documentation in the Regions' files. Specifically, in many cases the Regional officials could not provide any source document clearly showing that the accomplishment claimed actually occurred in FY87 ("source document not located"). In a number of other cases, the documents provided by Regional officials showed that, according to Agency definitions, the accomplishment should have been claimed in another fiscal year ("invalid FY87 actions").

Removal Starts and Completions

The Annual Report showed a total of 97 Removal Starts for Regions 2, 5, 8, and 9, while these Regions reported 107 Removal Starts to the auditors. The total of 75 Removal Completions in the Annual Report was less than the total reported by the Regions. We sampled 32 starts and 18 completions and found that, according to Agency definitions, 28 starts and seven completions (70 percent) were supported as valid FY87 actions. (Figures 1 and 2 below.)

FIGURE 1
REMOVAL STARTS

	Starts Per:					
Region	Annual Report	Region	Sample Size	Valid FY87 Actions	Source Documents Not Located	Invalid FY87 Actions
2	36	40	4	4		
5	35	40	7	7		
8	11	11	6	6		
9	15	16	15	11	4	
Total	97	107	32	28	4	0

FIGURE 2
REMOVAL COMPLETIONS

	Completions Per:					
Region	Annual Report	Region	Sample Size	Valid FY87 Actions	Source Documents Not Located	Invalid FY87 Actions
2	29	33	4	4		
5	30	37	0[1]			
8	4	4	2	2		
9	12	12	12	1	10	1
Total	75	86	18	7	10	1

---

[1] Review of a sample was not performed due to time constraints. We were forced to curtail our review to keep pace with the Agency's early schedule for Annual Report issuance.

Preliminary Assessments and Site Inspections

The Annual Report included 1,925 Preliminary Assessments (PA) as completed in FY87. The four Regions which we reviewed reported that 1,958 PAs were completed. In addition, the Annual Report indicated that 514 Site Inspections (SI) were completed in FY87, while these Regions reported 518. Of the 36 PA completions and 40 SI completions we examined, 26 PA and 33 SI completions (78 percent) were valid FY87 actions. Figures 3 and 4 below provide the detailed results of our review.

FIGURE 3
PRELIMINARY ASSESSMENT COMPLETIONS

	Completions Per:					
Region	Annual Report	Region	Sample Size	Valid FY87 Actions	Source Documents Not Located	Invalid FY87 Actions
2	505	524	12	11		1
5	802	814	12	7	1	4
8	132	134	2	1		1
9	486	486	10	7		3
Total	1,925	1,958	36	26	1	9

FIGURE 4
SITE INSPECTION COMPLETIONS

	Completions Per:					
Region	Annual Report	Region	Sample Size	Valid FY87 Actions	Source Documents Not Located	Invalid FY87 Actions
2	152	152	10	10		
5	224	228	22	16	6	
8	34	34	1			1
9	104	104	7	7		
Total	514	518	40	33	6	1

Remedial Investigations/Feasibility Studies

The Annual Report included 100 RI/FSs in FY87 for the four Regions we reviewed. However, these Regions reported only 96 RI/FS starts to the auditors. We sampled 62 RI/FSs and found 55 (89 percent) were valid FY87 actions. (Figure 5 below.)

FIGURE 5
REMEDIAL INVESTIGATIONS/FEASIBILITY STUDIES

	Starts Per:					
Region	Annual Report	Region	Sample Size	Valid FY87 Actions	Source Documents Not Located	Invalid FY87 Actions
2	30	30	5	5		
5	45	42	42	41		1
8	10	10	10	4		6
9	15	14	5	5		
Total	100	96	62	55	0	7

Records of Decision/Selection of Remedy

We found that the number of Records of Decision (ROD) which the Annual Report indicated were signed in FY87 was almost identical to the figure presented by the Regions. The Agency reported 40 completed RODs for the Regions which we reviewed, while these Regions reported 39. We reviewed the 39 RODs and found that only one was not a valid FY87 action.

Remedial Designs and Remedial Actions

Our scope of review for these two actions included Regions 2, 5, and 8 (due to time constraints, we could not complete field work in Region 9). The Annual Report included 47 Remedial Design (RD) starts, compared to 39 reported to the auditors by the three Regions. The Annual Report stated that 26 RAs were started in FY87, while the three Regions reported 21 RA starts. Twenty-one of the 24

RD starts and all of the 15 RA starts that we reviewed were supported by source documentation as FY87 actions. (Figures 6 and 7 below.)

FIGURE 6
REMEDIAL DESIGN STARTS

	Starts Per:					
Region	Annual Report	Region	Sample Size	Valid FY87 Actions	Source Documents Not Located	Invalid FY87 Actions
2	22	19	3	3		
5	18	13	14[1]	13		1
8	7	7	7	5		2
Total	47	39	24	21	0	3

---

[1] The sample is greater than the Regional figure because we located an additional FY87 start in the Region's files.

FIGURE 7
REMEDIAL ACTION STARTS

	Starts Per:					
Region	Annual Report	Region	Sample Size	Valid FY87 Actions	Source Documents Not Located	Invalid FY87 Actions
2	10	8	2	2		
5	12	10	10	10		
8	4	3	3	3		
Total	26	21	15	15	0	0

Additional Comments

During our review, we also identified concerns with the Annual Report in such areas as definitions of terms and RI/FS timeframes. Further, a recent Office of Inspector General (OIG) "Capping" Report titled *EPA, Office of the Inspector General Audits of Superfund Cooperative Agreements for Fiscal Years 1985 through 1987* (Audit Report No. E5eE8-09-0018-80838), dated March 29, 1988, consolidated the results of numerous OIG reviews and pointed out many of the same concerns that we are reporting.

The Annual Report includes information on the number of "starts" for various activities. During our review we found that there is confusion among Agency personnel on how a "start" is defined. The Agency officially defines "start" as a financial transaction, i.e., when funds are obligated to perform the activity. It is important for the reader to understand that under this definition, no actual on-site work needs to have begun to officially qualify as a start. Our review of Regional records showed that for many "starts", only funding transactions occurred during FY87. So although these met the Agency's definition, no actual on-site work took place. For example, three of the 42

RI/FS starts and three of the ten RA starts which Region 5 reported were for funding documents prepared in September 1987, but no on-site work had begun at the time of our review in February 1988. The OIG "Capping" Report discussed the same condition. Further, while this definition may be widely known at Headquarters, many Regional officials were not aware of it. This caused problems in our review, because when questioned, Regional officials frequently had to ask the auditors to define a "start" before they could give us any information.

We believe that it is important for the reader to fully understand the Annual Report's discussion of "operable units", and the implications this recordkeeping method has for overall Superfund accomplishments. EPA frequently divides Superfund "sites" into "operable units" to more easily manage the cleanup process. Each of these operable units (OU) may address a different problem at, or a different portion of, a site. For example, one site in Region 8 had four operable units. An RI/FS was completed on one OU during FY87, and RI/FSs were in process on the other three OUs. These three OUs will be reported as completions in future years, but they all pertain to that one site. At another Region 8 site, records showed that as many as 11 OUs existed. Five of the seven Region 8 RODs signed during FY87 were for OUs at this one site. Because EPA uses this method of recordkeeping, it is difficult to correlate the number of actions (RI/FSs, RODs, etc.) taken during FY87 with overall cleanup progress at Superfund sites.

Appendix D of the Annual Report shows the status of active RI/FSs and RAs on September 30, 1987. This table shows the planned completion date as estimated on January 1, 1987. However, the table may not show any previously published schedules for RI/FSs and RAs. Therefore, if a project will not meet a previously published schedule, the table will not reveal this fact. Section 2.4 of the Annual Report states that EPA chose the January 1, 1987, date because it marked the first update for RI/FS and RA projects after the hiatus between Superfund authorizations. Further, EPA officials believed that choosing an earlier date would have included time lost due to circumstances beyond EPA's control. However, regardless of what may have caused the delays, EPA is not providing the precise information required by CERCLA Section 301(h)(1)(C).

The "Capping" Report identified the same concerns we did with the accuracy of the Agency's Superfund information systems. For example, the CERCLA Information System (CERCLIS) is one of EPA's key tracking systems and represents an inventory of all potential hazardous waste sites known to EPA. OIG audits have found that Regions are not inputting accurate and up-to-date information into CERCLIS. Even though the Agency was aware of these problems, it relied on CERCLIS for some information in the Annual Report.

Finally, the "Capping" Report summarized problems with documentation in Regional files, which we also found during our review. In many cases, Regional officials had great difficulty locating the required source documents in their files, and in some cases they could not find these documents at all. For example, Exhibit 2 shows that source documents could not be located for 28 percent of the removal actions and three percent of the remedial actions we reviewed.

In discussing the discrepancies between the numbers in the Annual Report and those that Regional officials provided to the auditors, Office of Emergency and Remedial Response (OERR) officials stated that they considered the differences to be minor. These officials objected to our securing information from the Regions, stating that Headquarters management systems are the official Agency systems to which the Regions report. Further, the Director of OERR explained that there is only one EPA "system", and that even though some data in this system was not accurate, the problem is data entry into the system.

Annual Report Chapter 7.0 -- Development and Evaluation of Permanent Treatment Technologies

We reviewed the information presented in the Agency's report on the Superfund Innovative Technology Evaluation (SITE) Program, since most of the FY87 progress made in developing and evaluating permanent treatment technologies was centered in this program. We again used the January 1988 Report draft to begin our field work, and reviewed updated drafts as they became available. To determine if the information presented on the SITE Program was reasonable and accurate, we interviewed officials from the Office of Solid Waste and Emergency Response (OSWER) and the Office of Research and Development (ORD), who jointly administer the program. Additionally, we visited ORD personnel at the Hazardous Waste Engineering Research Laboratory, who are responsible for the technical aspects of the field demonstrations, and reviewed available files and source documentation. Based on our review, we believe that the information presented on the SITE Program is generally reasonable and accurate.

Annual Report Chapter 13.0 -- Executive Branch Estimate of Resources Needed to Complete CERCLA Implementation

We did not perform in-depth audit work on this chapter of the Annual Report, because it consists of FY87 obligations, the resource estimates from the FY88 Operating Plan, and the Agency's budget request for FY89, all of which is readily available information. We wish to emphasize that the figures presented are not estimates of the exact Agency needs for completely accomplishing the requirements of CERCLA.

The language of CERCLA suggests that Congress may have wanted estimates in the Annual Report for the total cost of completely implementing the statute. Although some projections beyond FY89 were included in one of the last drafts of the Annual Report, they were removed during the Agency review process.

During the Agency's internal review of the Report, the Office of General Counsel commented that the resource projections in Chapter 13 do not go as far as the statute requests. Further, the Office of Policy, Planning and Evaluation recommended a more comprehensive approach for future reports.

We are not aware of any current, comprehensive study within EPA to define the needs for accomplishing the CERCLA requirements. However, a recent report by the Surveys and Investigations Staff of the Committee on Appropriations, U.S. House of Representatives, points out the gap between current Superfund funding and potential "real" needs. In a March 1988 report, *Status of the Environmental Protection Agency's Superfund Program*, the committee staff stated that, using average cost estimates to clean up National Priorities List (NPL) sites, "793 sites (would) require Federal funds ranging from about $16.7 to $23.8 billion, far in excess of the available $8.5 billion." The report also noted that this estimate does not account for the possibility of hundreds of new sites being added to the NPL.

Annual Report Appendix C -- Detailed ROD Descriptions

Historically, Congress has expressed concerns with some aspects of EPA's decision-making processes. One purpose of the CERCLA requirement for detailed feasibility studies descriptions was to help Congress better understand how EPA makes decisions on Superfund sites.

The OIG believes that the level of detail contained in the Annual Report's feasibility studies descriptions does not provide sufficient information so that EPA's decision-making process on Superfund sites can be fully understood. The feasibility studies write-ups generally contained a brief description of the site, discussion of initial work done at the site, overview information about the feasibility studies (including only one sentence summaries of the cleanup alternatives considered), selected information on the requirements considered, and a brief summary of the reasons for selecting the chosen remedy.

In our opinion, the descriptions of the cleanup alternatives need to be expanded to clearly demonstrate the extent of EPA's decision-making efforts. The ROD documents, from which the Annual Report was prepared, contain a great deal of information on the alternatives, such as costs, benefits (including consideration of CERCLA goals), and risks to the public health and the environment. If the feasibility studies descriptions had contained this additional information, it would have greatly aided the reader in understanding how EPA made these decisions.

Exhibit 3 to our report is an example of a more complete feasibility study write-up, which we believe demonstrates the additional information that should have been made available to the reader.

Annual Report Preparation Process

The process used to prepare the Annual Report was not fully effective. Although this Report was due to Congress January 1, 1988, the Report was not completed until January 1989. Since this is the first time the Report was prepared, some problems were expected. However, the problems which we identified in our report seem to have been much greater than they should have been.

Part of the reason that the Annual Report encountered such difficulties is that the Report coordinator's resources were limited. Also, at his grade level (GS-13), he was not in a position of authority from which to command action on the part of other organizations whose input was vital. For example, as of March 1988, the Report coordinator was still uncertain of the sources and accuracy of many of the accomplishments figures in the Report. Despite our repeated requests for detailed information over a period of four months, he was unable to secure the information from the Agency offices responsible for compiling it. Further, the coordinator had different figures for the same accomplishments, depending on which information system he used. This should not be the case six months after the end of the fiscal year, and is a further adverse reflection on the reliability of the Agency's information systems.

OSWER officials stated that the main information system, CERCLIS, has been improved for FY88. These officials believe that the use of the improved CERCLIS will enhance the accuracy of the FY88 Annual Report, as well as decrease its preparation time. However, this system will also contain information that is not reliable, unless steps are taken to ensure that Regional input to CERCLIS is accurate and complete.

Exhibit 1

FY87 Activities
Annual Report vs. Regional Records

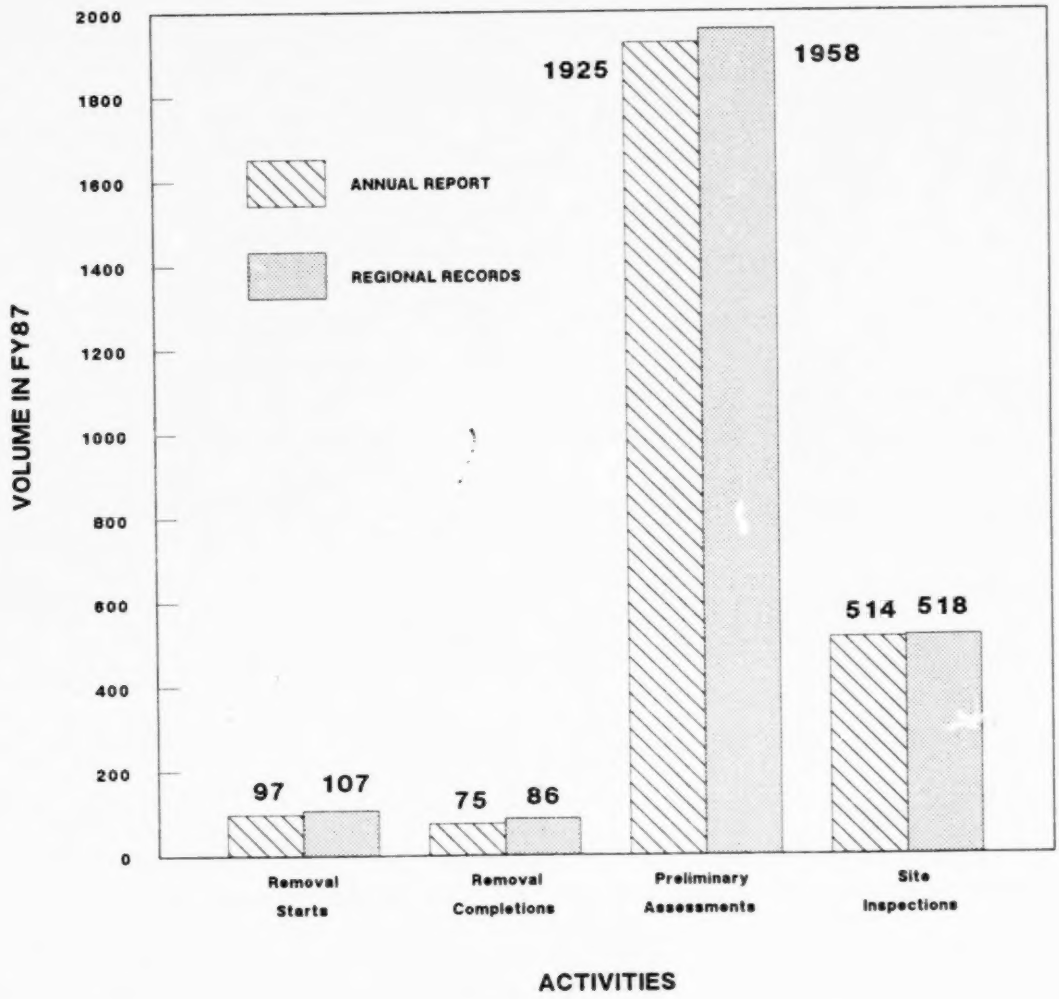
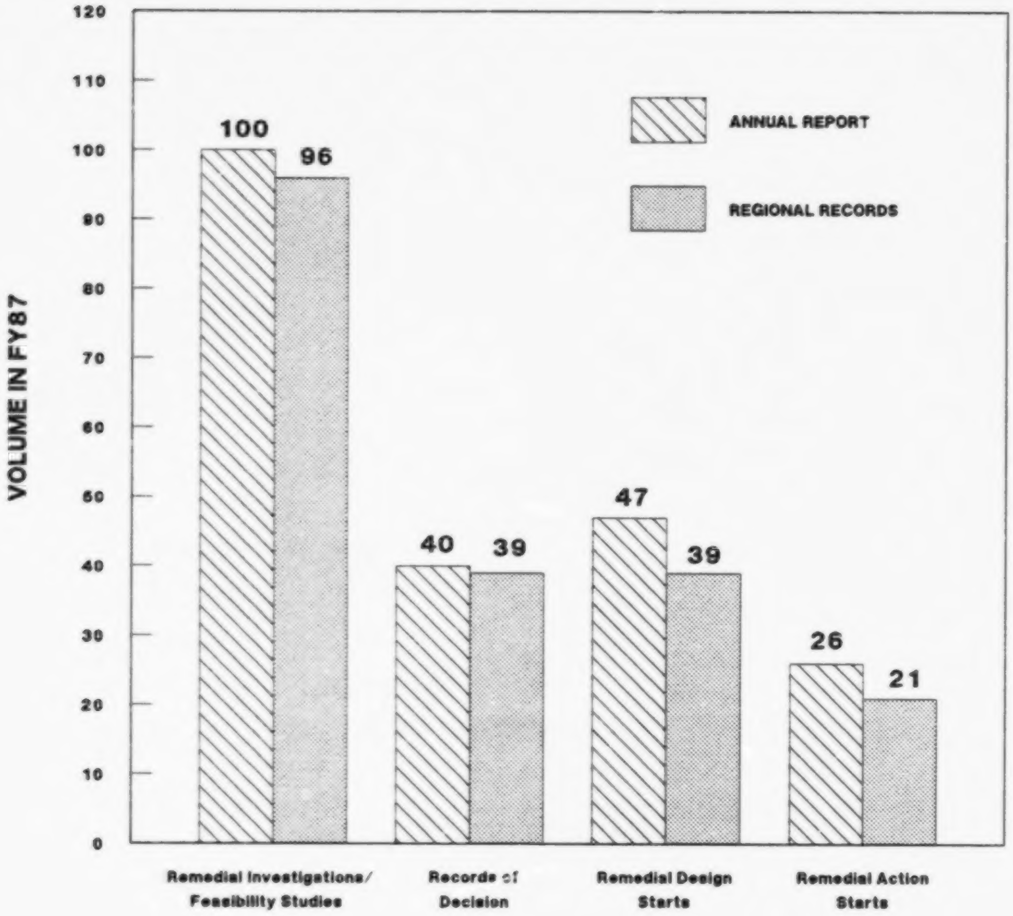


Exhibit 1
(continued)

FY87 Activities

Annual Report vs. Regional Records



ACTIVITIES

Exhibit 2

Review of Regional Records for FY87

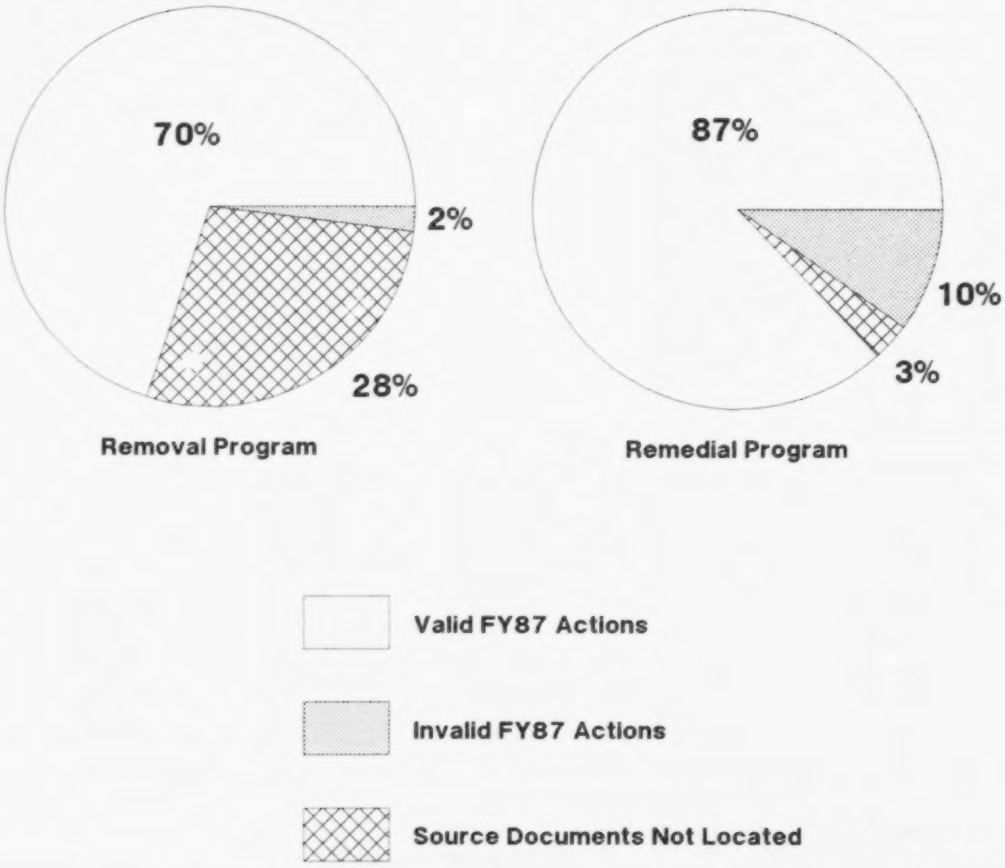


EXHIBIT 3

FEASIBILITY STUDY WRITE-UP EXAMPLE

This exhibit highlights the additional information we believe should have been included in the feasibility studies write-ups. As an example, we have inserted this extra information, quoted from the ROD, into the existing Annual Report text on the Laskin/Poplar Oil Site. We have indented this additional information to identify it for the reader.

LASKIN/POPLAR OIL SITE
SOURCE MATERIAL OPERABLE UNIT
ASHTABULA COUNTY, OHIO

HRS Score: 35.95 **NPL Rank: 492**

Background

The Laskin/Poplar Oil Site is located west of the village of Jefferson in Ashtabula County, Ohio. The 9-acre site is bounded by Cemetery Creek and the Ashtabula Fairgrounds. The site was formerly used for greenhouse operations beginning in the 1930s. Boilers were installed to heat the greenhouses in the 1950s, and tanks to hold waste oil for burning were built in the 1960s. When the greenhouse business declined, the owner of the site began collecting, reselling, and disposing of waste oils, much of which contained PCBs and other hazardous materials.

The State of Ohio initiated action against the site owner in 1979 for air and water pollution violations. In late 1980, EPA evaluated the need for remedial action at the site and in 1982 undertook an emergency action, which included removing 302,000 gallons of oil, treating 430,000 gallons of contaminated water, and solidifying 205,000 gallons of sludge. Potentially responsible parties (PRPs) removed another 250,000 gallons of oil wastewater in 1985 and 1986. EPA issued an Administrative Order of Consent to 12 PRPs between 1984 and 1986, requiring their participation in the remediation process.

EPA divided remedial activities at the site into two operable units and an overall site investigation. The first operable unit addressed the incineration of contaminated water and PCB-contaminated oils. The ROD for the second operable unit, which focused on source material that remained on site, was signed September 30, 1987. The overall site investigation still is being conducted and will address ground water, surface water, and soil contamination as well as the extent of dioxin contamination.

Description of Site Work

When the overall RI was initiated, the site contained 34 tanks, 4 pits, and treatment and retention ponds. Preliminary sampling indicated large amounts of seepage from tanks and unlined pits into surrounding soils. Investigations also identified a threat from contaminants leaching into ground and surface water, including Cemetery Creek, which runs into the Grand River, a source of drinking water for 25,000 residents.

Potentially responsible parties, under consent order, initiated the study for the second operable unit in 1985 to characterize the remaining on-site wastes. Results indicated that waste materials still present at the site after emergency removal actions posed a serious threat to human health and the environment through the threat of fire and exposure to PCBs. Major contaminants of concern at the site are PCBs, polynuclear aromatic hydrocarbons (PAHs), and volatile organic compounds (VOCs), all of which were present in high concentrations in waste oil and surrounding soils.

Description of Feasibility Study

The Phased Feasibility Study (PFS) for the second operable unit evaluated remedial alternatives for the removal of source materials, including sludges, waste oils, wastewaters, and contaminated soils (included in this operable unit because they were a source of potential contamination of ground and surface water). All attempts were made during the PFS to ensure that the alternatives developed for this operable unit were consistent with final remediation for the site. Remedial alternatives developed included the following:

Alternative 1

> Under this alternative, no remedial action would be taken at the site. The threat to public health and the environment would remain.

Alternative 2

> Alternative 2 consists of solidifying all of the liquid wastes and placing all of the source material in a licensed TSCA or RCRA facility as appropriate. All tanks would be dismantled and taken off site. The pit area would be backfilled with on-site soils and graded to preclude ponding.
>
> No long-term maintenance or monitoring at the Laskin/Poplar Oil site would be required under this alternative. However, the waste would not be treated prior to landfilling at the licensed facility. The long-term dependability of any landfill is unknown. The cost estimate for Alternative 2 is $4.2 million.

Alternative 3

> Alternative 3 combines on-site incineration of the oils, sludges, and source soils with off-site treatment of the wastewaters, decontamination water, and scrubber water. The incinerator ash and dismantled tanks would be disposed in an off-site RCRA licensed facility. If tests indicated that the ash could be delisted, the ash could be sent to a

sanitary landfill. The excavated pit area would be backfilled with onsite soils and graded to preclude ponding.

This option would not require any long-term maintenance or monitoring at the site. All source material would be treated to the greatest extent practicable. The cost estimate for Alternative 3 is $8.5 million.

Alternative 4

Alternative 4 utilizes off-site incineration for all oils, sludges, and highly contaminated soils. All wastewaters and decontamination water would be treated at an off-site treatment facility. The tanks would be demolished and disposed of at a licensed facility offsite. The excavated areas would be backfilled with on-site soils and graded to preclude ponding.

This option would not require any long-term maintenance or monitoring at the site. All source material would be treated to the greatest extent practicable. The cost estimate for Alternative 4 is $12.2 million.

Alternative 5

Alternative 5 includes on-site incineration of all oils and sludges as well as soils with greater than 25 parts per million (ppm) PCBs or 500 ppm total halogenated organics. The remainder of soil excavated from the tank and pit areas would be landfilled off site at a RCRA licensed hazardous waste facility along with all dismantled tanks. All wastewaters, decontamination water, and scrubber water would be treated at an off-site treatment facility. The excavated areas would be backfilled with on-site soils and graded to preclude ponding.

This alternative would not require any long-term maintenance or monitoring at the site. The most highly contaminated source material would be permanently treated. However, the soils that would be landfilled, which comprise roughly one-half of the source material, would not be treated. The off-site disposal of waste without treatment is the least favored option under SARA. The cost of Alternative 5 is $5.8 million.

With the exception of no action (Alternative 1), all of the alternatives would effectively and permanently minimize the danger to the public health and the environment at the site area through the removal of the contaminated material.

The use of an off-site landfill (Alternatives 2 and 5) is conventional, easy to implement, and transfers the operation and maintenance to the owner/operator of the landfill. The most significant disadvantage of this option is that it does not treat the contaminants so there is no reduction in toxicity, volume, or mobility. It also may be difficult to maintain the long-term integrity of hazardous waste landfills as required by the U.S. EPA's off-site policy. The off-site disposal of contaminated materials without treatment is the least preferred option under SARA.

The off-site incineration of the source materials (Alternative 4) offers the advantage of permanently destroying the contaminants in the waste material and the soils. It is a proven technology that transfers operation and maintenance to the owner/operator of the incinerator facility. One of the most significant disadvantages of this alternative is implementability. The material must be packaged in small fiber drums for transportation.

The facilities available have commitments to their regular clients which control when and at what rates the source material can be taken care of. In addition, a number of off-site hazardous waste incinerators have shown a reluctance to accept the waste material due to high levels of lead found in some of the sludges. Transportation of the waste to an off-site facility increases both the cost of this alternative and the risks posed to the public by movement of contaminated materials on the highways.

As with off-site incineration, on-site incineration (Alternatives 3 and 5) would utilize a proven technology to permanently destroy the contaminants in the source material. The advantages of this alternative are that the packaging requirements necessary for off-site incineration would be avoided, and all material could be processed in one year or less once the incinerator begins operation. This alternative also meets the goal of SARA of implementing a remedial action which incorporates treatment rather than land disposal where practicable.

A comparison of the alternatives on the basis of protectiveness of public health and the environment shows that on-site and off-site incineration provide a high level of protection. Alternatives which use a high degree of landfilling provide an equal level of protection in the short run. The long run dependability of landfills, however, is unknown. There would be no beneficial impacts associated with the no action alternative.

Any detrimental environmental effects associated with the waste and soil removal operations would essentially be the same for each alternative except the no action alternative.

> These short term negative impacts could be minimized using proper construction methods.

The PFS identified the Federal and State applicable or relevant and appropriate requirements (ARARs) that the remedial action must meet, consistent with the requirements of CERCLA. One technology considered for use on the site was on-site containment of the wastes. However, because the RCRA land disposal restrictions were considered ARARs, this option was not considered further. Other ARARs identified for this site included RCRA thermal destruction, incinerator, and off-site transportation regulations; Ohio Clean Air Act limits on incinerator emissions; and Ohio regulations for the off-site transportation of hazardous waste.

> The State of Ohio and the U.S. EPA expressed preference for remedial actions that would provide destruction of hazardous constituents in lieu of transporting untreated wastes to a RCRA approved location. Section 121(b)(1) of SARA states "Remedial actions in which treatment which permanently and significantly reduces the volume, toxicity or mobility of the hazardous substances, pollutants, and contaminants is a principal element, are to be preferred over remedial actions not involving such treatment. The off-site transport and disposal of hazardous substances or contaminated materials without such treatment should be the least favored alternative remedial action where practicable treatment technologies are available."

Public comment on the RI/FS was received during a public availability session, a public meeting, and through written comments. Residents and local officials supported the selected remedy discussed below.

Description of Selected Remedy

The remedy selected was on-site incineration of all oils, sludges, and contaminated soils and the off-site treatment of contaminated waters (Alternative 3). This alternative uses a proven technology (i.e., incineration), and, because contaminated materials are destroyed, it satisfies CERCLA's preference for permanent solutions and use of treatment technologies. The remedy also does not involve the off-site transportation of hazardous materials (i.e., the oils, sludges, and contaminated soils) before treatment; when implemented, it will provide a high level of protection of human health and the environment. The remedy is also expected to meet all ARARs for this operable unit. The State of Ohio was consulted during the remedy selection process and concurred with the chosen alternative.

APPENDIX G

LIST OF EXHIBITS

Exhibit Number	Title of Exhibit	Page
1.0-1	Summary of Fiscal 1987 Superfund Program Activities	3
1.0-2	Summary of Program Activity by Fiscal Year	4
2.2-1	Fiscal 1987 Removals by State	20
2.2-2	Removal Actions by Fiscal Year	24
2.2-3	Completed Removals by Incident Category	25
2.3-1	Historical Superfund Pre-Remedial Program Accomplishments	27
2.3-2	Map of National Priorities List Sites	31
2.3-3	National Priorities List Sites Per State/Territory July 1987	32
2.3-4	Historical National Priorities List Sites	34
2.3-5	Fiscal 1987 Accomplishments for Remedial Investigation/Feasibility Study Starts and Records of Decision	37
2.3-6	Historical Superfund Remedial Investigation/Feasibility Study Starts and Records of Decision	38
2.3-7	Summary of Remedy Selection in Records of Decision Signed During Fiscal 1987	41
2.3-8	Historical Data on Remedies Selected in Records of Decision	43
2.3-9	Fiscal 1987 Accomplishments for Remedial Design and Remedial Action Starts	44
2.3-10	Historical Superfund Program Remedial Design and Remedial Action Starts	45
2.4-1	Status of Remedial Investigation/Feasibility Study and Remedial Action Projects at the End of Fiscal 1987	54

LIST OF EXHIBITS
(continued)

Exhibit Number	Title of Exhibit	Page
2.4-2	Remedial Investigation/Feasibility Study and Remedial Action Projects in Progress at the End of Fiscal 1987 by Region/State	55
2.5-1	Facilities Subject to CERCLA Section 121(c)	60
2.6-1	Cost Recovery Activities	62
2.6-2	Value of Cost Recovery Settlements by Fiscal Year	63
5.3-1	Fiscal 1987 Contract Awards	85
5.3-2	Site Samples Analyzed for Remedial Investigations/ Feasibility Studies by Fiscal Year	86
5.4-1	Fiscal 1987 Superfund Program Resources to Regional Offices	89
5.4-2	Historical Superfund Program Resources to Regional Offices	90
5.4-3	Fiscal 1987 Superfund Resources by Program Function	92
5.4-4	Fiscal 1987 Superfund Resources by EPA Office and Function	93
5.4-5	Historical Superfund Program Resource Distribution	94
5.4-6	Fiscal 1987 Superfund Interagency Support Resources	97
10.2-1	Federal Facilities Listed on the Initial Hazardous Waste Compliance Docket	132
10.2-2	Distribution by Region of Federal Facilities on the Hazardous Waste Compliance Docket	133
10.7-1	EPA Facilities on the Hazardous Waste Compliance Docket	136

LIST OF EXHIBITS
(continued)

Exhibit Number	Title of Exhibit	Page
11.3-1	Minority Firm Share of Superfund Contracting by Type, Fiscal Year 1987	143
13.2-1	EPA Superfund Staffing Requirements by Fiscal Year	153
13.2-2	EPA Superfund Funding Requirements by Fiscal Year	154
13.2-3	Summary of EPA Superfund Workload by Fiscal Year	155
13.2-4	EPA Superfund Interagency Funding by Fiscal Year	156
13.3-1	Annual Superfund Resource Needs of Other Federal Departments and Agencies	159
13.3-2	Federal Superfund Implementation Funding Requirements by Fiscal Year	160
13.3-3	Federal Superfund Implementation Staffing Requirements by Fiscal Year	161
	EPA Headquarters and Regional Superfund Offices	169

APPENDIX H

LIST OF ABBREVIATIONS

ABNs -- Acid and Base/Neutral Compounds

ANPRM -- Advance Notice of Proposed Rulemaking

ARARs -- Applicable or Relevant and Appropriate Requirements

ARCS -- Alternative Remedial Contract Strategy

ASTSWMO -- Association of State and Territorial Solid Waste Management Officials

ATS -- Action Tracking System

ATSDR -- Agency for Toxic Substances and Disease Registry

CA -- Cooperative Agreement

CDC -- Centers for Disease Control

CERCLA -- Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended

CERCLIS -- CERCLA Information System

CERI -- Center for Environmental Research Information

CERT -- Council of Energy Resource Tribes

CIS -- Contract Information System

CLP -- Contract Laboratory Program

DDT -- Dichloro-diphenyl-trichloroethane

DOC -- Department of Commerce

DOH -- Department of Health

DOI -- Department of the Interior

DOJ -- Department of Justice

DOL -- Department of Labor

DOT -- Department of Transportation

LIST OF ABBREVIATIONS
(continued)

EDA -- Emergency Declaration Area

EE/CA -- Engineering Evaluation/Cost Analysis

EHS -- Extremely Hazardous Substance

EMSL -- Environmental Monitoring Services Lab

EPA -- Environmental Protection Agency

ERCS -- Emergency Response Cleanup Services

ERNS -- Emergency Response Notification System

ERT -- Emergency Response Team

ESAT -- Environmental Services Assistance Teams

FAA -- Federal Aviation Administration

FDER -- Florida Department of Environmental Regulation

FEMA -- Federal Emergency Management Agency

FIFRA -- Federal Insecticide, Fungicide,and Rodenticide Act

FIT -- Field Investigation Team

FMS -- Financial Management System

FY -- Fiscal Year

GICS -- Grant Information Control System

GSA -- General Services Administration

HAZMAT -- Hazardous Materials

HHS -- Department of Health and Human Services

HRS -- Hazard Ranking System

HRSD -- Hazardous Response Support Division

HSED -- Hazardous Site Evaluation Division

IAG -- Interagency Agreement

LIST OF ABBREVIATIONS
(continued)

IG -- Office of the Inspector General

IRCN -- Interagency Report Control Number

IRM -- Initial Remedial Measure

IWT -- International Waste Technologies

LOE -- Level of Effort

MBDA -- Minority Business Development Agency

MBDCs -- Minority Business Development Centers

MBEs -- Minority Business Enterprises

MCLs -- Maximum Contaminant Levels

MOU -- Memorandum of Understanding

NAAG -- National Association of Attorneys General

NAMC -- National Association of Minority Contractors

NBARs -- Nonbinding Allocations of Responsibility

NCP -- National Contingency Plan

NEIC -- National Enforcement Investigation Center

NEPA -- National Environmental Policy Act

NGA -- National Governors' Association

NIEHS -- National Institute for Environmental Health Sciences

NOAA -- National Oceanic and Atmospheric Administration

NPL -- National Priorities List

NPRM -- Notice of Proposed Rulemaking

NRC -- National Response Center

NRT -- National Response Team

NTP -- National Toxicology Program

LIST OF ABBREVIATIONS
(continued)

NYSDEC -- New York State Department of Environmental Conservation

O&M -- Operation and Maintenance

OAQPS -- Office of Air Quality Planning and Standards

OECM -- Office of Enforcement and Compliance Monitoring

OERR -- Office of Emergency and Remedial Response

OHRM -- Office of Human Resource Management

OMB -- Office of Management and Budget

OMSE -- Office of Management Systems Evaluation

OPA -- Office of Policy Analysis

OPMT -- Office of Program Management and Technology

ORD -- Office of Research and Development

ORP -- Office of Radiation Programs

OSC -- On-Scene Coordinator

OSDBU -- Office of Small and Disadvantaged Business Utilization

OSHA -- Occupational Safety and Health Administration

OSR -- Office of Standards and Regulations

OSWER -- Office of Solid Waste and Emergency Response

OWPE -- Office of Waste Programs Enforcement

PA -- Preliminary Assessment

PADER -- Pennsylvania Department of Environmental Resources

PAHs -- Polycyclic Aromatic Hydrocarbons

PASS -- Procurement Automated Source System

PCBs -- Polychlorinated Biphenyls

POTWs -- Publicly-Owned Treatment Works

LIST OF ABBREVIATIONS
(continued)

PRP -- Potentially Responsible Party

RA -- Remedial Action

RAC -- Response Action Contractor

RCRA -- Resource Conservation and Recovery Act

RD -- Remedial Design

REM -- Remedial Planning (Contract)

RI/FS -- Remedial Investigation/Feasibility Study

ROD -- Record of Decision

RPM -- Remedial Project Manager

RQ -- Reportable Quantity

RRTs -- Regional Response Teams

SARA -- Superfund Amendments and Reauthorization Act of 1986

SBA -- Small Business Administration

SCAP -- Superfund Comprehensive Accomplishments Plan

SCDHEC -- South Carolina Department of Health and Environmental Quality

SDC -- Settlement Decision Committee

SI -- Site Inspection

SITE -- Superfund Innovative Technology Evaluation

SMOA -- Superfund Memorandum of Agreement

SPMS -- Strategic Planning and Management System

STSP -- Superfund Technical Support Program

SWCB -- State Water Control Board

TAGs -- Technical Assistance Grants

TAT -- Technical Assistance Team

LIST OF ABBREVIATIONS
(continued)

TCE	--	1,1,1-Trichloroethane
TES	--	Technical Enforcement Support
TPQ	--	Threshold Planning Quantity
TSCA	--	Toxic Substances Control Act
USCG	--	United States Coast Guard
VOCs	--	Volatile Organic Compounds
VORCE	--	Volume Reduction/Chemical Extraction Process
VORRP	--	Volume Reduction Research Project
WBEs	--	Women's Business Enterprises
WQC	--	Water Quality Criteria

STATE ABBREVIATIONS

AK -- Alaska
AL -- Alabama
AR -- Arkansas
AZ -- Arizona
CA -- California
CO -- Colorado
CT -- Connecticut
DE -- Delaware
FL -- Florida
GA -- Georgia
GU -- Guam
HI -- Hawaii
IA -- Iowa
ID -- Idaho
IL -- Illinois
IN -- Indiana
KS -- Kansas
KY -- Kentucky
LA -- Louisiana
MA -- Massachusetts
MD -- Maryland
ME -- Maine
MI -- Michigan
MN -- Minnesota
MO -- Missouri
MS -- Mississippi
MT -- Montana
NC -- North Carolina
ND -- North Dakota
NE -- Nebraska
NH -- New Hampshire
NJ -- New Jersey
NM -- New Mexico
NV -- Nevada
NY -- New York
OH -- Ohio
OK -- Oklahoma
OR -- Oregon
PA -- Pennsylvania
PR -- Puerto Rico
RI -- Rhode Island
SC -- South Carolina
SD -- South Dakota
TN -- Tennessee
TX -- Texas
UT -- Utah
VA -- Virginia
VT -- Vermont
WA -- Washington
WI -- Wisconsin
WV -- West Virginia
WY -- Wyoming

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1.0 EXECUTIVE SUMMARY

2.0 RESPONDING TO RELEASES OF HAZARDOUS SUBSTANCES

3.0 THE FEDERAL-STATE PARTNERSHIP IN IMPLEMENTING CERCLA

4.0 PUBLIC INFORMATION AND COMMUNITY RELATIONS

5.0 PROGRAM AND IMPLEMENTATION SUPPORT

6.0 EPA RULEMAKING ACTIONS TO IMPLEMENT CERCLA

7.0 DEVELOPMENT AND EVALUATION OF PERMANENT TREATMENT TECHNOLOGIES

8.0 TECHNOLOGICAL AND HEALTH-RELATED RESEARCH AND DEVELOPMENT AND TECHNICAL ASSISTANCE

9.0 EPA AND AGENGY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY HEALTH-RELATED ACTIVITIES

10.0 IMPLEMENTATION OF THE FEDERAL FACILITIES REQUIREMENTS

11.0 MINORITY FIRM PARTICIPATION IN SUPERFUND CONTRACTING

12.0 THE NATIONAL RESPONSE TEAM AND REGIONAL RESPONSE TEAMS

13.0 EXECUTIVE BRANCH ESTIMATE OF RESOURCES NEEDED TO COMPLETE SUPERFUND IMPLEMENTATION

14.0 OTHER EPA ACTIONS TO IMPLEMENT CERCLA

APPENDIX A: STATUTORY LANGUAGE

APPENDIX B: REMOVAL ACTIONS

APPENDIX C: ROD DESCRIPTIONS

APPENDIX D: RI/FS AND RA STATUS REPORT

APPENDIX E: *FR* DOCUMENTS

APPENDIX F: INSPECTOR GENERAL REPORT

APPENDIX G: LIST OF EXHIBITS

APPENDIX H: ABBREVIATIONS

H2D